

# **Brain Bee**

# **Organizer's**

# **Manual**



---

Developed and compiled by Julianne McCall, 2013  
The International Brain Bee, a program of MIND, Inc., was founded by Dr. Norbert Myslinski

# **Welcome to the Brain Bee community!**

As a **Brain Bee** Organizer, you are demonstrating the greatest commitment to neuroscience education and youth support- thank you! With your effort, you join a global community of scientists, physicians, educators, and students working toward creating thoughtful programs to inspire and encourage youth to pursue ambitious academic and professional careers in the neurosciences.

Coordinating any event can be challenging and demanding, particularly one that seeks to educate young people in a complicated subject. This manual was developed to help share currently practiced procedures and hopefully provide support to new and established programs around the world. The goal is to update the manual on a biennial basis with additional examples and best practices as the community continues to grow. Please consider contributing more templates, extended sections, and further detailed descriptions by sending an email to [BrainBeeManual@gmail.com](mailto:BrainBeeManual@gmail.com).

# Contacts & Acknowledgements

The International Brain Bee was established by Dr. Norbert Myslinski and is a program of MIND, Inc. (Mankind for International Neuroscience Development, Inc.). For questions regarding the International Brain Bee, contact the IBB Coordinator at [brainbee@gmail.com](mailto:brainbee@gmail.com).

To contact a local or national Brain Bee Coordinator, refer to the following:

<http://www.internationalbrainbee.com/local.html>

[http://www.internationalbrainbee.com/natl\\_bees.html](http://www.internationalbrainbee.com/natl_bees.html)

[http://www.internationalbrainbee.com/local\\_USA](http://www.internationalbrainbee.com/local_USA)

This manual was created by Julianne McCall in June, 2013. Much gratitude is due to Dr. Norbert Myslinski and Dr. Linda Richards for their generous help. Other thoughtful contributors include Dr. Doug Nitz, Debbie Honeycutt, and Dr. Nestor Matthews.

# Table of Contents

Page

▪ General Rules.....	5
▪ Team Management.....	7
▪ Sponsorship and Finance.....	12
▪ Student Recruitment.....	21
▪ Competition Format.....	25
▪ Study Materials and Preparation.....	30
▪ Competition Rules and Judging.....	34
▪ Event Day.....	39
▪ Press.....	43
▪ Templates and Samples.....	48

# General Rules

Starting and running a Brain Bee is not necessary as time-consuming or costly as one might think. A local Brain Bee can actually be organized cost -free: all that an organizer needs is a location for the competition, a neuroscientist to judge the answers, and high school students. Each local Brain Bee is organized by a coordinator who is affiliated with a university, high school, museum, biotech company, Society for Neuroscience Chapter, or similar community. Local coordinators are given the flexibility to conduct their event at any time or place and with as much or as little conformity to other Brain Bees as desired to individualize the participant experience appropriately for their region. However, all Brain Bees are required to follow some basic rules in order to uphold a high standard and overall fairness of the program.

# The Rules

- Only official local or national Brain Bee Chapters are permitted to use the Brain Bee name and logo
- All local chapters are to report annually to the International Brain Bee (IBB) Coordinator (see Sample USA Local Report form, page 120)
- All national chapters are required to report annually to the IBB Coordinator (see Sample National Report form, page 121)
- No recording devices can be used at the competition during the question-and-answer period
- All local Brain Bees must have at least one person knowledgeable in neuroscience to act as a judge (such as a neurologist, psychologist, neuroscientist, etc). Email the IBB Coordinator at BrainBee@gmail.com if assistance is necessary in finding a judge.
- Each local Brain Bee must have competitors from at least three different schools
- No registration fees may be collected from competitors
- A student can compete in only one local Brain Bee per year
- A student can compete in their respective National Competition only once
- Questions should be based on *Brain Facts* or *Neuroscience: Science of the Brain*, both freely downloadable from [www.brainfacts.org](http://www.brainfacts.org) and [www.ibro.org](http://www.ibro.org). *Brain Facts* is also available as an audio version at [http://www.sfn.org/index.aspx?pagename=brainfacts\\_audio](http://www.sfn.org/index.aspx?pagename=brainfacts_audio). Confidential questions and answers are available for coordinators only free of charge from the IBB Director via BrainBee@gmail.com. Other resources may be selected for additional questions. Selected chapters from the following textbooks have also been used: Neuroscience: Exploring the Brain (2006; by Mark F Bear Barry W Connors and Michael A Paradiso) and The Brain (by Watson et al.).

# **Team Management**

- Recruiting your team
- Coordinating your team
- Running your event
- Web presence

# Recruiting your team

## Guiding Principles

### 1 Get the right organizing team

This can often be one of the greatest challenges, but the benefits of gathering a select, passionate group of people that share the vision of the **Brain Bee** will determine the success, reach, and sustainability of the entire program. The most effective Brain Bee organizers are self-managed, hard-working, and committed to and excited about sharing neuroscience with students. University and graduate students have historically been very active.

### 2 Develop leadership roles

While many of the efforts along the way to organizing a Brain Bee event will require several people from the team working in concert with one another to reach high-quality outcomes, each member of the core group of organizers should assume a leadership role of one or more of the main tasks. These select leaders will ensure that the work is completed in a timely manner, supply the volunteers with necessary resources, and confirm that the finished product meets the high standard set by the group.

### 3 Critical Skills

Brain Bee programs are often put on with dedicated volunteers and limited financial resources. Yet some expenditures on professional assistance can end up saving time as well as elevating the quality of the event in the long run. Unless volunteers are able to be recruited with such professional skills as graphic design, photography, catering, and web design, consider hiring vendors for these aspects of the event, as your budget allows.

### 4 Secondary Volunteers

A secondary team of volunteers can assist core group members in their tasks, as well as staff the event. Like you, volunteers will be giving significant amounts of their time on behalf of this endeavor. Find ways to express to them their value throughout event planning. From perks such as being acknowledged on the website to a volunteer appreciation gift, you can help build and maintain a collective of happy and engaged volunteers.

# Coordinating your team

## Guiding Principles

### 1 Engage your team in the Brain Bee concept

You shouldn't be the only believer of the Brain Bee concept on your team. Allow some time for team members to share their passion for sharing neuroscience and incorporate creative ideas into the program development.

### 2 Create an organizational plan

Lay out the key goals and milestones for each role. A timeline with fixed dates will help focus the team on critical tasks over the course of the planning process.

### 3 Consult with local experts

When planning the date and time of the event, consult with local secondary school educators and administrators to avoid periods of heavy examinations or major athletic or academic competitions.

### 4 Meet with your core team regularly

Sweat the details. Schedule regular meetings according to the group's availability to get updates and talk about next steps.

### 5 Establish a venue early

Choosing the venue early on will help solidify a healthy impression of a well-organized event to schools and sponsors. Characteristics to look for in a venue, other than cost-free, are the availability of a stage, a networking/eating area, space for optional break-time demonstrations, proximity to parking, access to a kitchen or food preparation room, audio/video capabilities, and inclusion of event insurance.

# Running your event

## Guiding Principles

### 1 Keep track of the details

Event production is one of the most dynamic parts of the Brain Bee planning process. If you or one of your team members doesn't have production experience, consider recruiting team members who do. Use regular meetings and checklists to stay on top of things.

### 2 Be flexible

In the hustle and bustle of event day, something invariably doesn't happen according to plan. Task someone with the responsibility of being the event day manager. Have backup options available for as many things as possible.

### 3 Develop an Event Day Script

Develop a script and timeline for the event day that can be referenced by volunteers, including the event emcee and vendors. Confirm everything in the weeks leading up to the event, including venue, volunteers, judges, and student participants. Make sure everyone is aware of their responsibilities for the day.

### 4 Printed Programs

Programs must have the following sentence: "The International Brain Bee was founded by Dr. Norbert Myslinski and is a program of MIND, Inc. (Mankind for International Neuroscience Development, Inc.)."

## Templates and Samples

Sample Event Program (Australian Brain Bee Challenge)- page 49

Sample Event Program (German Brain Bee)- page 50

Sample Volunteer Checklist- page 52

Sample Event Day Script- page 54

# Web presence

## Guiding Principles

### 1 Develop a website

Whether you choose a free blog website or decide to pay a minimal cost for a domain name, having an official website has shown to enhance the visibility of the event, improve the participants' satisfaction with information availability, pique the advertising interests of potential sponsors, and help to sustain participants' engagement with the program. Consider including the following information: news and updates, event and program history, downloadable study materials, competition location and transportation directions, registration process and forms, photo gallery, links to National/International competition resources, and optional neuroscience-related activities for independent study. Websites must include the following sentence: "The International Brain Bee was founded by Dr. Norbert Myslinski and is a program of MIND, Inc. (Mankind for International Neuroscience Deveelopment, Inc.)."

### 2 Engage in social media

Consider also creating a Facebook page to post news updates, photos, press, and perhaps even news unrelated to your event, but likely interesting to the participants (e.g., Nobel Prize announcements, fascinating news in neuroscience, scholarship application announcements, etc). Social media has proven to be the most utilized method of maintaining connections among students after the event.

## Select Sample Websites

<http://www.abbc.edu.au/>

<http://germannationalbrainbee.org/>

<http://www.science.mcmaster.ca/brainbee/>

<http://personal.denison.edu/~matthewsn/brainbee.html>

<http://sandiegobrainbee.com/>

# **Sponsorship and Finance**

- Brain Bee sponsorship rules
- Determining sponsorship needs
- Planning your budget
- Approaching sponsors
- Sponsorship package examples

# Sponsorship Rules

## **1 Sponsors cannot influence content.**

Sponsors may have no editorial control or veto power over your program. The only exception is allowing one judge (in the case of at least two judges participating in the event) that represents a sponsoring company.

## **2 Organizers must find their own sponsors.**

It is the responsibility of each local Brain Bee Organizing Committee to approach their own prospective sponsors. The IBB Coordinator may not help find local sponsors. Agreements on the national or international level must be pre-approved by MIND, Inc. on official letterhead.

## **3 Brain Bee events cannot be used to make money.**

All funds from your Brain Bee event must be applied to your event. If you are fortunate enough to have excess money available afterward, you might invest it in your next Brain Bee event or refund the sponsoring companies with the balance.

# Determining sponsorship needs

## Guiding Principles

### 1 Prioritize budget needs

Making a project budget before you begin and prioritizing the most important cost elements for your event can help you approach potential sponsors in a targeted way.

### 2 Consider in-kind contributions

Many Brain Bee event costs can be covered through in-kind contributions from sponsors. Other costs require cash. Determining how much of each kind of contribution you need can help you prioritize who to approach.

#### Costs that are commonly covered by sponsorship

- Brain Bee Champion 1st Place Gift Package, including travel to the National or International Brain Bee (cash)
- Venue Cost (cash or in-kind)
- Event insurance (cash or in-kind)
- Printing and Mailings (cash or in-kind)
- Event Production (cash or in-kind)
- Catering (cash or in-kind)
- T-shirts (cash)
- Website domain (cash)
- Participation bag contents (cash or in-kind)
- Student travel (train fees, gas costs, etc) to the event, including parking

# Planning your budget

## Guiding Principles

### 1 Understand accounting rules

Rules differ from country to country, so the way you set up your event's finances and accounting system depends on where you live. You may set up a nonprofit, but if you do so, it can't be anything related to the official Brain Bee Organizing Committee. You can also run the event through an existing nonprofit.

### 2 Estimate more

Unless you have extensive planning experience, the rule of thumb in budgeting is 1.5x your estimate.

## Best Practices

- Make a detailed budget from the beginning
  - Develop a budget that includes a line-by-line breakdown of key categories, such as Venue, Catering, Prize Packages, Student Travel, Photography, Graphic Design, Website, Printing, and Production.
- Work closely with the Sponsorship Organizer
  - Meet regularly with the volunteer in charge of sponsorship development. Together, you can strategize around needs and opportunities and oversee fundraising progress.
- Make note of bills that need to be paid upfront
  - Funding doesn't always come through in-sync with your schedule. Sometimes, student participants register at the last minute or there are delays with sponsorship donations, so don't count on the cash to always offset expenses that occur before the event. Make a note of which expenses need to be paid upfront and what can be paid after the event.

## Sponsorship and Finance

---

- Be aware of expensive line items  
Expenses such as your 1st Place Champion's travel package to the next level competition or catered food can be very high. Make note early in the process of these high ticket items. They can help focus your sponsorship efforts.

## Templates and Samples

Sample Budget- Page 57

# Approaching sponsors

## Guiding Principles

### 1 View sponsors as partners

With the Brain Bee, sponsorship is really about partnership and collaboration around science education. Seeking sponsors that share your vision is critical to successful sponsorship.

### 2 Show the value of the Brain Bee

While the Brain Bee program is strong in many areas, stress the value of your local event and the benefits corporate sponsors will have if they are associated with the brand.

### 3 Make it easy to contribute

The best incentive for sponsorship is to make it easy and accessible for the sponsors. Creating mechanisms such as an entity to receive cash donations and a tiered level of sponsorship make it easier for sponsors to contribute and will go a long way in successfully funding your event.

## Best Practices

The recruitment of sponsors is a challenge for many Organizers, and the initial challenge is translating the Brain Bee concept into a language corporations will understand. Generally, when approaching a potential sponsor, you will need to explain what the Brain Bee is, generate excitement about the opportunity, and convince potential sponsors that supporting your endeavor is worth their while.

- Send out a sponsorship letter
  - It's important to educate potential sponsors about the Brain Bee and reach out to them in the spirit of collaboration.

## Sponsorship and Finance

---

- Set up a mechanism to receive cash contributions  
The easiest way for sponsors to contribute is for them to pay vendors directly or provide in-kind contributions. However, many potential sponsors find this difficult to manage and you may need to set up structures to enable you to appropriately receive money. Many Brain Bee Organizers both in the US and overseas have set up 501(c)3 or non-profit organizations to be able to receive funds. Others have found partner organizations to receive the money on the Organizers behalf and pay vendors for services.
- Create tiers for sponsorship  
Creating levels of sponsorship can help engage more sponsors and yet keep control of the budget. Previous Brain Bee events have had \$250, \$500, and over \$1000 sponsorship tiers.
- Timing the sponsorship contact  
Many Brain Bee Organizers have a staged approach that includes a letter followed by phone calls or emails for detailed discussions. Some Organizers have also met personally with sponsors, also providing a brief presentation.
- Sign clear and focused sponsor agreements and promptly provide invoice letters  
It's important to make sure your sponsor agreements highlight specifically what the sponsor intends to provide, how they will provide it, and what they will get in return. For tax purposes, it is also the responsibility of the Brain Bee Organizer to provide an official invoice, stating clearly the agreed exchange.
- Target companies or institutes that have an established role in community science outreach  
Some organizations have distinct budgets for science outreach. Seek out this information from administrations of local research institutes or universities.

## Sponsorship and Finance

---

- Consider approaching the following types of organizations, institutes, and companies:
  - University student organizations (particularly science-oriented groups like Premedical Societies, Science Departmental Clubs, Education-related groups, etc)
  - research supply vendors (see example sponsorship request letter)
  - University Offices of the President/Dean/Provost
  - Research Centers or Consortia
  - State-funded outreach programs
  - Science museums
  - SfN Chapter grants
  - private philanthropists
- If other means of fundraising are necessary, consider the following events:
  - restaurant-sponsored benefit fundraisers (perhaps specific to US charitable practices)
  - bake sales
  - neighborhood yard work
  - car washes
  - work at a ballpark (Baseball stadiums typically support fundraisers)

### Templates and Samples

Sample Letter to Sponsors- Page 58

Sample Invoice- Page 59

# Sponsorship Package Examples

- Logo appears in printed program / Logo appears on the stage during the event / Logo appears on the website
- Special "thank you" will be given by the Emcee during the event introduction
- Can provide items in a gift bag and/or judges' and volunteers' gifts
- Product or interactive science demonstration before or after the event and/or during breaks
- Sponsor logo printed on Brain Bee t-shirt - always smaller than the Brain Bee event logo
- Dedicated sponsor area at the event location, outside of the main stage area
- Advertisement of a company's own science outreach program

# **Student Recruitment**

- Gathering contacts
- Make a recruitment strategy
- Letter of Invitation

# Gathering Contacts

## Guiding Principles

### 1 Local Schools

Search for a list of all schools in your area. Online lists do exist, for example via Wikipedia, and universities can often also provide lists of local high schools from which they advertize university outreach programs.

### 2 Some school websites will directly list science teacher contacts

Though this method of gathering contact details can be quite tedious, it often leads to the most effective avenue of communication with those individuals whom are most likely to join the effort in encouraging students to participate.

### 3 Science Teacher Networks

Many countries and regions will host science teacher or general educator networks. Contact a friendly high school administrator or science teacher and ask about such networks.

### 4 Established university outreach networks

Many universities will already have lists of secondary school contacts, including teachers and students, representing individuals that have participated in previous programs administered by the university.

### 5 Websites of research institutes and science societies

Many science societies and research institutes with an outreach program will gladly add your local Brain Bee event to their activity calendar and/or forward your announcement letter to their email networks. Also consider social media, in addition to websites.

# Make a recruitment strategy

## Guiding Principles

### 1 Predict the level of involvement

If your upcoming event is the first in the region, prepare for some challenges in recruiting students. It is often the case that schools and teachers are inundated with invitations to participate in programs, so it should not be a surprise if many of your contact efforts go unnoticed. If your program is well established and highly recognized in the area, you should set the limit of participating students per school very low to allow for as many schools and areas to be represented as possible.

### 2 Within-school competitions

If you are presented with the lucky case that many students from one school are interested in participating, it has been done within the Brain Bee community that some schools host "within-school" Brain Bee competitions. This is most often conducted in the form of a multiple-choice quiz, but it can be more elaborate based on the engagement level of the secondary school teachers and the local Brain Bee Committee.

### 3 Class workshops and presentations

For areas in which student recruitment poses a challenge, several Brain Bee Organizers adopt a "door-to-door" strategy, offering to personally present the Brain Bee to high school classes in an enthusiastic and engaging manner to better connect with potential student participants. Presentations of the event can also be combined with hands-on science workshops, such as a demonstration of sensory systems, like optical illusions, a brain dissection practical, or a brief analysis of comparative neuroanatomy, if you have access to brain tissues from different species.

# Letter of Invitation

## Guiding Principles

### 1 Provide sufficient information about the program

At the time of sending the letter, you should already have worked out the main event logistics, including date, time, competition format, financial support, and prize packages. Also, add a brief description of your official connection to the International Brain Bee.

### 2 Explain the registration process

Include deadlines and detailed instructions on how to register for the event. In cases where you limit the number of participants from each school, you may require an email from each student's teacher as a nomination, confirming the maximum number of students is not exceeded. Some Brain Bee Organizers have set-up online webforms to collect registration information (such as Google Forms or Survey Monkey), while others request an email with a list of necessary information.

### 3 Direct readers to further information online

Whether you set-up a free website via one of numerous blogging websites or develop a website from scratch, in this day and age, web presence is very helpful to spread a good impression of the event, distribute study materials (downloadable from the website), educate your community about the event with news updates, and provide a powerful incentive for sponsors to engage with the event, whereby you may advertize their role in the program.

## Templates and Samples

Sample Event Brochure (Australian Brain Bee Challenge)- Page 60

Sample Event Briefing (Australian Brain Bee Challenge)- Page 62

Sample Invitation Letter to Teachers (German National Brain Bee)- Page 64

Sample Registration Invitation (Australian Brain Bee Challenge)- page 66

# Competition Format

- Basic Format:
  - Live Question-and-Answer
- Advanced Formats:
  - Advanced Live Question-and-Answer
  - Written Quiz
  - Neuroanatomy and Neurohistology
  - Patient Diagnosis

# Live Question-and-Answer

The live question-and-answer format is the only format which all Brain Bee events must conduct, however the details of how the competition is conducted is still left to the discretion of the Organizers.

## Guiding Principles

### 1 Available Resources

Established questions and answers are available (in English) for both *Brain Facts* and *Neuroscience: Science of the Brain* booklets, freely downloadable directly at <http://www.brainfacts.org/about-neuroscience/brain-facts-book/> and <http://www.scribd.com/collections/3277825/Neuroscience-Science-of-the-Brain>. Email the IBB Director at [brainbee@gmail.com](mailto:brainbee@gmail.com) to confirm your Coordinator status and receive the confidential packet. In addition to these resources, you are free to write your own questions from the suggested material.

### 2 Event Flow

Determine a time limit for each question, the format by which students individually approach and depart from the podium, and how students are allowed to answer. Student participants are clever enough to take advantage of judges that accept vague answers or lead judges to assist in their answering, so it is imperative that judges declare their expectations upfront. A designated timer should manage the clock, indicating clearly when the time is up. Two designated scorekeepers should keep track of all points earned.

### 3 Podium formats

The live question-and-answer session may be judged by the accumulation of points or by ranking, the latter determined by elimination of contestants based on the number of incorrect answers given. Most Brain Bee competitions include a first session, where answers are weighted by difficulty level (for example, Least Difficult= 2 points; Moderately Difficult= 3 points; Most Difficult= 4 points) and students accrue points based on their performance. Students are then ranked by number of points, and the top-achieving students (typically, 10 students are selected) proceed to the final round, which is then conducted in double- or triple-elimination style. The Organizers may choose how the difficulty levels are designated.

# Advanced Live Question-and-Answer

Some Brain Bee competitions have developed a system whereby all contestants respond to the same questions, posed live by the Judging Panel. Some questions may also appear on a projected screen, which allows for images to be used. Equipped with tablets of paper, index cards, or dry-erase boards, the students are allowed some time to respond to each question by writing their answer down. The Judges may then collect the answers for later grading or have an assistant read their responses out loud for on-the-spot assessment. In the case of live assessment by the Judges, it should be noted that the students may not be allowed to defend their answer after the response time is exhausted.

# Written Quiz

The Written Quiz has been adopted by most Brain Bee Organizers as an additional component of the event, to help equalize the difficulty of the competition across all participants. Whereas the basic live question-and-answer session necessarily asks different questions of different students, the written quiz allows all students the chance to be challenged by the same questions. The Written Quiz also allows graphics to be used in the questions, as well, stimulating students' abilities in data analysis or graphic interpretation.

## Templates and Samples

Sample Written Quiz- Page 68

# Neuroanatomy and Neurohistology

Likely the most universal knowledge across the vast fields of neurosciences is neuroanatomy. This optional competition component allows students to prepare beyond strict textual memorization and provides an opportunity to connect with applications of neurology, neuropsychiatry, and neurosurgery.

## Guiding Principles

### 1 Acquire brain tissues and/or models

Most universities will have an anatomy department with a sufficient number of human brain tissues and/or models. If brain tissue can be used, Organizers should take into consideration the location of the tissues and account for any necessary transportation, added time in the event program, and the availability of safety materials (gloves and masks). Neurohistochemistry can be easily added with some simple light microscopes and tissue section slides.

### 2 Question formats

With the neuroanatomy and neurohistochemistry practical, questions can range from asking for names of structures to requesting primary functions of labeled structures to identifying structural networks.

## Sample Questions

Name this structure / fluid-filled space / artery / sulcus / gyrus / lobe.  
What is the primary function of this structure?  
What type of information is received by this structure?  
To which structure does this area send information?

Sample Neuroanatomy List- Page 70

# Patient Diagnosis

For those Organizers seeking to administer a competition that challenges more conceptual thinking, a Patient Diagnosis section would certainly satisfy that aim. Some Brain Bees enjoy the support of volunteer patient actors, whereas others show video footage of actual patients demonstrating stereotypical behavior. The key to a successful Patient Diagnosis section is to maintain consistency in the presentation of the neurological diseases, particularly if using patient actors. An added component includes allowing students to request results from laboratory or imaging examinations, as if they were the physicians narrowing the diagnosis. It is also necessary to select examples that demonstrate the most common forms of the diseases.

## Templates and Samples

Sample Patient Diagnosis Instructions for Live Actor Format- Page 72

# **Study Materials and Preparation**

- Student contact
- Optional additional study materials
- Optional Live Review Session

# Student Contact

## Guiding Principles

### 1 Ample Email Contact

Some students will be excited, others anxious; all will appreciate steady and informative email contact to set their expectations leading up to the big day. Include information as important as the program schedule and transportation instructions and as seemingly mundane as the dress code and anticipation of the event food.

### 2 Open up for questions

At the end of each email contact, consider allowing students to ask questions about the event and/or competition material. You must decide among your team the type and extent of information you will include in the competition, for example, whether you will accept acronyms as sufficient answers instead of full names (e.g., for neurotransmitters). Students frequently pose these sorts of questions via email, so it is also good to have one person responsible for responding to student emails, so as to maintain consistency in the email responses.

### 3 Student Information

At the time of registration, consider collecting the following details from each participant: Name, School, Grade, Email Address, Preferred Phone Number, Mailing Address, T-shirt size, Science Teacher's Name and Email Address, Number of Guests expected to attend, distance to travel to attend the event, dietary restrictions, and mobility limitations.

## Sample Emails

Sample registration confirmation email to students- Page 73

Sample event info email to students- Page 74

Sample last-minute email to students- Page 76

# Optional Additional Study Materials

Some Brain Bee Organizers choose to prepare their students directly with self-composed Study Guides. For those local Brain Bees serving low-income areas, providing study materials is considered one practice to help "level the playing field", in that all students have access to all necessary information, in the case of competitions which test information beyond the *Brain Facts* or *Neuroscience: Science of the Brain* booklets, namely, the optional neuroanatomy and patient diagnosis sections.

## Templates and Samples

Sample Neuroanatomy Study Guide- Page 77

Sample Patient Diagnosis Study Guide- Page 84

# Optional Live Review Session

For those Brain Bee events that are host to local regions, a live review session is one of the best ways to comfort student participants in allowing them access to the competition venue and the opportunity to meet the Organizers and fellow student participants ahead of time.

## 1 Material Overview

While most students will participate in a Review Session to get hints about what types of questions they are likely to be presented on the competition day, an overview of the material is generally a comfortable start to a Review Session. Presenters are encouraged to emphasize sections from which the most questions will be asked.

## 2 Game Format

Consider a game format, similar to Jeopardy, where all students have the chance to answer questions and, if correct, choose the next subject and difficulty level. Email [BrainBeeManual@gmail.com](mailto:BrainBeeManual@gmail.com) for an interactive powerpoint version of such a game.

## 3 Sample Questions

From some Organizers' experiences, Review Sessions that include several questions similar in style and content to those prepared for the competition are those that are most welcomed and appreciated by students. To be fair to all participants, including those unable to attend the Session, a summary should be sent to the email list.

## 4 Event Extras

Try to budget for snacks and time to allow participants to mingle and get to know one another.

### Templates and Samples

Sample Review Session Summary- Page 106

# **Competition Rules and Judging**

- International Brain Bee recommended rules
- Recruiting and preparing judges

# IBB Recommended Rules

Responsibilities of Judges: All judges must follow the *Judging Guidelines*. A copy of the *Guidelines* should be made available to the judges before the competition. Individual guidelines using the word “must” are required. Individual guidelines using the word “should” are preferred. If situations arise that are not covered by the *Guidelines*, judges must make decisions that are fair and equitable for all competitors. All decisions of the judges are final. There is no appeal process. It is the responsibility of the Coordinator to make sure the *Guidelines* are followed.

Qualifications of Judges: All Brain Bee competitions must have one or more judges. Multiple judges with different areas of neuroscience expertise are preferred. Judges must have proven knowledge of the human brain. Preferably, it should be someone with an advanced degree in neuroscience, psychology, neurology, psychiatry or a similar profession. Judges should not be chosen who have real or apparent conflicts of interest.

Duties of the Judges: Judges should not be given any other concurrent duties. Their attention should be totally focused on judging. Separate volunteers should be used as timers, scorekeepers, and readers of the questions. Scores should be kept, and calculations made, in duplicate, by at least two individuals.

Access to Questions: Judges should have access to the questions and answers before the competition, in order to familiarize themselves with them. Before the competition, judges have the freedom to change questions, remove questions, or alter answers if they find them inaccurate or awkward or beyond their expertise. However, they should not remove them, or skip questions, during the competition. All questions must be related to the science of the brain. Questions regarding other fields, such as politics, music, mathematics, and others, are not allowed unless they are directly related to brain science.

Competition Questions: Questions can be given orally or visually on a screen seen by everybody, or both. Answers to questions can be oral, written, or both. Different questions can be given to each competitor, or the same questions can be given to all. If different questions are given, reasonable efforts should be made by the coordinator to supply questions of comparable difficulty for each round.

## Competition Rules and Judging

---

Qualifications of Competitors: Individuals are allowed to compete in only one local Brain Bee competition per year. Coordinators of the next level determine if it is a calendar year or other designation. Usually, a “Brain Bee Year” is based on when the next level of competition occurs. It usually starts after the competition at the next level starts. By its nature, Brain Bees involve individuals competing against each other, not groups. However, group competitions are allowed as an additional activity, but they must not determine who is invited to the next level of competition (local to national, or national to international).

Format: Most Brain Bee competitions are simple question-and-answer. However, coordinators have the freedom to create competitions that are more complex. For example, they may involve neurohistology with microscopes, neuroanatomy with real brains or brain models, patient diagnosis with actors as patients, simple paper and pencil written tests, brain imaging identification, etc. In all cases, judges must be available to certify that the answers are correct.

Time Allotment: The amount of time given to competitors to complete their answers should be predetermined before any individual question is given. A timing device should be used that has an audible or visual signal indicating that the time is up. If the answers are written, all writing must stop when time is up. If the answers are oral, a competitor should be allowed to complete their answer if they start their answer when time is up.

Ties: Ties for first place should not be allowed. A competition should continue until one individual wins. If after the competition the winner is not able to compete in the next level of competition, then the coordinator must determine a fair method of determining who will advance to the next level. Usually it is the second place winner.

Fairness: Judges should not show bias to any competitor by giving them more time, giving them hints, or specifically choosing questions for certain individuals. Reasonable attempts should be made to eliminate the possibility of cheating. Keep all questions confidential before the competition. Auditory and visual recording devices must not be allowed during the competition. All questions should be kept confidential or destroyed after the competition. When answers are written, barriers should be provided, or seats separated, so as to prevent visual copying of the answers. The appearances of fairness should be maintained at all times.

## Competition Rules and Judging

---

### **Specific for Local Brain Bees**

Local competitors must be 14, 15, 16, 17 or 18 years of age.

English is the language of the Brain Bee. However, local Brain Bees can be in the local language.

### **Specific for National Brain Bees**

National competitors must be 14, 15, 16, 17, 18 or 19 years of age.

At least two judges are required, preferably in different areas of expertise in the neurological and psychological sciences.

Individuals are allowed to compete in a national competition only once, unless the national competition is the only Brain Bee competition in the country. In the latter case, individuals may not compete after having achieved 1st Place.

English is the language of the Brain Bee. However, national Brain Bees can be in the respective national language.

### **Specific for the International Brain Bee**

International competitors must be 14, 15, 16, 17, 18 or 19 years of age.

At least three judges are required, preferably with a diverse range of expertise in the neurological and psychological sciences.

Individuals are allowed to compete in the international competition only once.

English is the language of the Brain Bee. However, if a competitor does not speak English, a translator should be provided by the respective national coordinator or by the competitor. Translators should sign an agreement indicating that they will not give unfair advantage when translating.

# Recruiting and Preparing Judges

## Guiding Principles

### 1 Select judges that communicate well

Be very selective in choosing judges that are patient and able to communicate clearly to young students. If you have the luxury, also keep in mind to invite judges that represent different areas of neuroscience, to allow for more direct expertise across a spectrum of unpredictable answers.

### 2 Clear and direct instructions

As there are bound to be answers that are vague or fishing for guidance, judges must express to the students at the start of the event the type of answers they will accept. This requires that you, the Organizers, give clear instructions to the judges.

### 3 Task sharing

In the most common competition format, during the competition, judges will read questions and display "Correct" and "Incorrect" signs in response to student answers. A tried-and-true method to keeping order to the system is to have each judge read one question, followed by the next judge reading the next question. This allows time for the judges to pick a question from a hat, find the appropriate question in the printed packet of questions and answers, and respond to questions as they arise. Prior to the event, an Organizer should ensure that the judges are fully comfortable with their roles, have worked out a system among themselves, and have all appropriate resources, including a copy of all study material. It is also polite practice to provide water at the judges' table.

## Templates and Samples

Sample Invitation Email to Prospective Judge- Page 107

Sample Informational Email to Judges- Page 108

Sample Judging Instructions and Rules- 109

# Event Day

- Optional Activities
- Common Materials Checklist
- Prize and Gift Suggestions

# Optional Activities

## Guiding Principles

### 1 Lunch with scientists

Some Organizers have coordinated for visiting scientists and graduate or medical students to share lunch with participating students, with one graduate student and one scientist per small group of student participants. Discussions range from the scientists' specific work to science careers, research internships, the latest groundbreaking science news, and acquiring scholarships.

### 2 Neuroscience demonstrations

During breaks, during registration, and after the event, students and other attendees may enjoy browsing and interacting with various demonstrations outside of the main auditorium. For example, some Organizers have recruited neuroscience organizations to set-up booths and conduct brief hands-on science workshops, such as a demonstration of sensory systems, like optical illusions, a brain dissection practical, an electrophysiology trial, or a brief analysis of comparative neuroanatomy, if you have access to brain tissues from different species.

### 3 Brief seminars

Most students will have never had the opportunity to listen to a professional science talk, so a brief presentation of a scientist's field or specific work could be stimulating to many participants. Keep in mind, however, the potential stress level of some students, in that the seminars should not absorb much time of the program.

### 4 Lab Tour

Students generally enjoy having the opportunity to walk through a working research lab, whether or not they are given the chance to touch or even use the sophisticated equipment for a demonstration.

# Common Materials Checklist

Stopwatch  
Correct and Incorrect Signs  
Food  
Beverages  
Table Cloths, Flatware, Silverware, Glassware, Napkins  
Cleaning Supplies  
Decorations  
Trophy and Prize Packages\*  
Judges' gifts  
Volunteers' gifts  
Printed Programs  
Optional Competition Materials (Patient Diagnosis, Written Quiz, Anatomy Sheets, etc)  
Question and Answer Packets- request from IBB Coordinator  
Printed Scoresheets\*  
Name tags  
Judges' Table Name Placards  
Question numbers  
Hats to pull questions from  
Certificates\*  
Projector and Speakers  
Computer with appropriate background slide\*  
Music (for breaks)  
T-shirts  
Photographer Payment  
Posterboard and an easel for display  
Directional signage from main entrance and/or parking lot

## Templates and Samples

Sample Trophy Image and Text- page 110  
Sample Scoresheet- page 111  
Sample Certificates- page 112  
Sample Background Slide- page 114

\* denotes that a Sample/Template is available

# Prize and Gift Suggestions

## 1st Place Prize Package

- Rountrip travel and accommodation for student and one parent chaperone to the next level competition
- Trophy
- Gift Certificate to local university bookstore/online retailer
- Study Materials for next level competition
- Bouquet of flowers

## 2nd-5th Place Prize Packages

- Gift Certificate to local university bookstore/online retailer
- Nice vendor items, such as laser pointers
- Bouquets of flowers

## Judges' and Sponsors' gifts

- Arrangement of locally produced food and/or beverage
- Bouquet of flowers
- Gift certificates
- Engraved keepsakes, such as a small clock, paper weight, or plaque

## Participation Bags

- An interesting neuroscience/ popular science book
- Sweets
- Vendor items, such as laser pointers, notepads, t-shirts, hats, and/or pens
- University or local paraphernalia
- Custom bags
- Reusable water bottles with event logo

# Press

- Press Release
- Engaging local governmental officials

# Press Release

In a press release, include all necessary details about the event: date, location, organizing committee, number of student participants, number of attendees, concept of the program, program history and global reach, examples of program content, prize packages, names, schools, and hometowns of prize recipients, contact details, and sponsors. All press releases must have the following sentence "The International Brain Bee was founded by Dr. Norbert Myslinski and is a program of MIND, Inc (Mankind for International Neuroscience Development, Inc.)."

## Sample Press Releases

Sample Press Release from the International Brain Bee- page 115

Sample Press Coverage from the Australian Brain Bee Challenge- page 116

Sample Press Release from the Singapore National Brain Bee- page 119

# Engage Local Government Officials

Request city council/state and/or national government letters of support for winners and/or participants of Brain Bee events. When acquired, these letters are greatly appreciated by the students.

# Templates and Samples

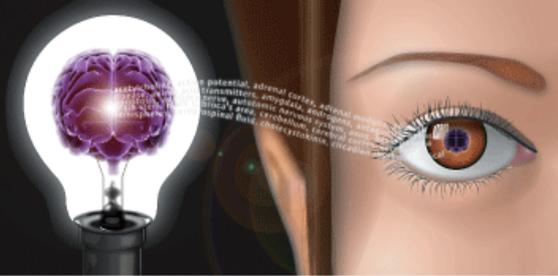
Content	Page(s)
Sample Event Program (Australian Brain Bee Challenge)	49
Sample Event Program (German Brain Bee)	50-51
Sample Volunteer Checklist	52-53
Sample Event Day Script	54-56
Sample Budget	57
Sample Letter to Sponsors	58
Sample Invoice	59
Sample Event Brochure (Australian Brain Bee Challenge)	60-61
Sample Event Briefing (Australian Brain Bee Challenge)	62-63
Sample Invitation Letter to Teachers (German National Brain Bee)	64-65
Sample Registration Invitation (Australian Brain Bee Challenge)	66-67
Sample Written Quiz	68
Sample Neuroanatomy List	70-71
Sample Patient Diagnosis with Live Actors	72
Sample registration confirmation email to students	73
Sample event info email to students	74-75

# Templates and Samples

Content	Page(s)
Sample last-minute email to students	76
Sample Neuroanatomy Study Guide	77-83
Sample Patient Diagnosis Study Guide	84-105
Sample Review Session Summary	106
Sample Invitation Email to Prospective Judge	107
Sample Informational Email to Judges	108
Sample Judging Instructions and Rules	109
Sample Trophy Image and Text	110
Sample Scoresheet	111
Sample Certificates	112-13
Sample Background Slide	114
Sample Press Release from the International Brain Bee	115
Sample Press Coverage from the Australian Brain Bee Challenge	116-18
Sample Press Release from the Singapore National Brain Bee	119
Sample USA Local Report Form	120
Sample National Report Form	121

# Australian and New Zealand Brain Bee Challenge

## 2011 out-smart out-think out-last



### Australian Brain Bee Challenge Queensland and Northern Territory State Finals Program

Tuesday 19th July 2011

Queensland Brain Institute - The University of Queensland

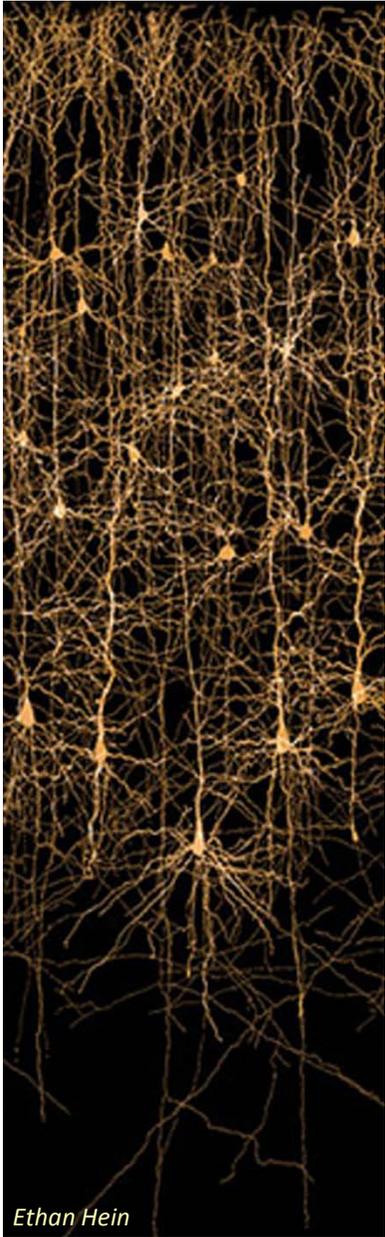
8:00am – 8:30am	Registration – collection of name tags, answer sheets, clipboard
8:30	Arrival: Jeremy Donovan and Kerry Pinkerstone (GenerationOne)
8:30am – 8:35am	Welcome – Professor Perry Bartlett, Director, Queensland Brain Institute
8:35am – 8:50am	Introduction and Program Outline for the day Professor Linda Richards (ABBC Coordinator and Head, Cortical Development and Axon Guidance Laboratory, QBI)
9:00am–9:15 am	Arrival: Dr Jim Peacock
8:50am – 9:30am	Individual Challenge – Part A Individual Challenge – Part B
9:30am – 9:55am	Guest Speaker: Jeremy Donovan
9:55am – 10:00am	Tour orientation – Dr Lizzie Coulson
10:00am – 10:15am	<i>Morning-tea 9</i>
10:15am – 11:30am	Tour <b>Group 1</b> Tour <b>Group 2</b>
11:30am – 12:00pm	Neuroscience lecture: “Neuro-ecology: Doing Neuroscience out in Nature” Professor Justin Marshall
12:30pm – 1:00pm	Guest Speaker: Dr Jim Peacock (CSIRO, Scientist in Schools Patron)
1:00pm – 1:30pm	<i>Lunch</i> Team Challenge <b>Group 2</b> – Preliminary Final
1:30pm – 2:45pm	Tour <b>Group 1</b> Tour <b>Group 2</b>
2:45pm – 4:00pm	Team Challenge <b>Group 1</b> – Preliminary Final
4:00pm – 4:15pm	<i>Announcement of Team Challenge Finalists (and play-off if required)</i> <i>Afternoon-tea</i>
4:15pm – 4:45pm	Queensland Team Challenge Final
4:45pm – 5:00pm	Prize presentation and closing remarks <i>Collection of Information Packs and t-shirts</i>



A neuroscience education initiative established in Australia by  
the Queensland Brain Institute and the UQ Faculty of Science

Below are some media files from the recent Queensland State Final held at the Queensland Brain Institute on July 19<sup>th</sup> 2011

We are truly grateful to the generous sponsors that have made this event possible:

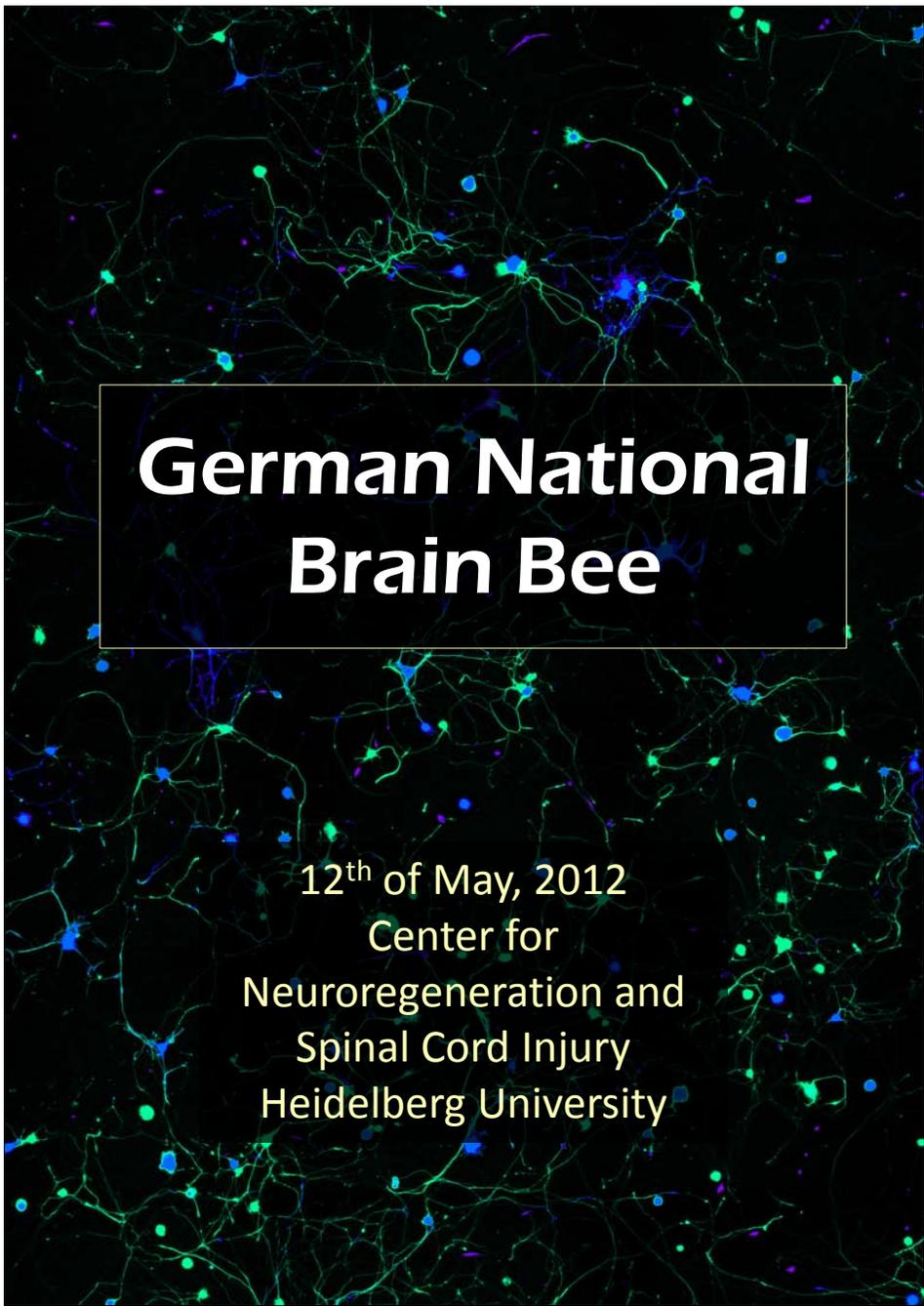


Ethan Hein

The  Hartmut Hoffmann-Berling  
International Graduate School of  
Molecular & Cellular Biology  
**H B I G S**



UNIVERSITY OF HEIDELBERG  
INSTITUTE FOR  
ANATOMY AND  
CELL BIOLOGY



# German National Brain Bee

12<sup>th</sup> of May, 2012  
Center for  
Neuroregeneration and  
Spinal Cord Injury  
Heidelberg University

# German National Brain Bee

## Event Program

Stiftung Orthopädische Universitätsklinik  
Heidelberg, Germany

13:30	Registration	<i>Atrium</i>
13:45	Welcoming Remarks	<i>Auditorium</i>
14:00	Group Photo	<i>Auditorium</i>
14:05	Written Section	<i>Auditorium</i>
14:20	Podium Section I	<i>Auditorium</i>
15:00	Break	<i>Atrium</i>
15:15	Neuroanatomy Section	<i>Seminar Room</i>
15:40	Patient Diagnosis	<i>Auditorium</i>
16:20	Break	<i>Atrium</i>
16:45	Finalists Podium Round	<i>Auditorium</i>
17:15	Awards Ceremony	<i>Auditorium</i>

## Judging Panel

Prof. Dr. Armin Blesch, *Director of the Center for Neuroregeneration, Heidelberg University*

Prof. Dr. Andrea Möller, *Professor of Biology and Science Education, Trier University*

Prof. Dr. Stephan Frings, *Coordinator of the Interdisciplinary Neurosciences Centre Masters Program, Centre for Organismal Studies Heidelberg*

## Neuroscience Education Booths

### Neurosimulation

Computer-based modeling demonstrates typical cellular interactions that make up neural circuitry in the brain.

### Comparative Neuroanatomy

Explore the evolution of the brain across nine species by analyzing the physical differences in neural structures.

### Taste Perception and Visiomotor learning

Test your senses and your neural plasticity in these hands-on activities that assess your brain processes.

## German Brain Bee Committee

Beatrice Sandner, Research Neuroscientist, Heidelberg Spinal Cord Injury Center  
Ina Simeonova, Graduate Student, Interdisciplinary Neurosciences, Heidelberg Uni.  
Katarina Zimmer, 2011 German Brain Bee National Champion  
LaShae Nicholson, Graduate Student, Mannheim University of Applied Sciences  
Yun-Hsuan Chang, Medical Student, Heidelberg University  
Julianne McCall, Graduate Student, HBIGS and IZN, Heidelberg University

*This Brain Bee is an officially sanctioned event of The International Brain Bee©.*

## **Sample Volunteer Roles & Responsibilities**

**Host:** act as host to keep the event moving, opening remarks, introduce the judges, thank sponsors, close First Round and announce lunch. Have lunch at assigned table, announce the 10 finalists, announce winner and runner-up, present trophy & gift certificate to winner and gift certificate to runner-up, closing remarks.

**(Has been covered with Nick 1/29/08 at NSI)**

**Judges 1 & 2:** Take turns pulling question # from the hat, read the question and determine if the answer is CORRECT or INCORRECT based upon the answer sheets provided, will hold up the signs that say that, have lunch at assigned table.

**Judge 3/Timekeeper:** act as time keeper (15 seconds) for each question asked, take turn asking student questions, assist with getting students on stage, photo, have lunch at assigned table, assist with awards presentation and thank & present gift to Nick.

**Scorekeeper:** keep score of points, tally points, give Nick 10 finalists names (after lunch) to announce and bring students back on stage, post winners on poster board, have lunch at assigned table and act as general expert on Brain Bees.

### **7 Student Luncheon table hosts and 7 grad students:**

Report to assigned table, interact with students, promote conversations, answer questions. Be in audience during Brain Bee if possible.

**Registration:** greet, look up names & check off, distribute name tags, answer questions, hand student competitor takeaway bag. 2 Grad Students to man table to "write names" of unknown guests and to remain after start to be available for late check in and right before lunch.

**Microphone:** man the microphone on stage during both sessions and hand student as they approach mark in front of judges. Reclaim as the student returns to seat for next student handoff.

**Photographer:** take photos to include initial group shot, Brain Bee judges & host, informal shots during the bee and at lunch. Try to capture each table (it would be helpful if you kept track of the table #s). Take finalists (10), runner-up and winner shots at conclusion.

**Photographer Assistant:** work with Mike to ensure we know who (generally) are in the individual shots (i.e. write down the table #s).

**Catering and Facilities:** manage these activities

**Volunteer/Guest Coordinators:** be available to greet volunteers, judges, host, sponsors, press etc. to explain their role

**Auditorium direction** : stationed in the auditorium to provide direction to people coming in, students to the stage and guests to general seating. Be available to answer questions.

**Assistance:** be available to help during the setup and during both rounds.

## Sample Brain Bee- Script

**10:15**

- **Emcee** Mic Sound Check

**11:00**

- Students enter auditorium for on-stage group photo

**11:05**

- Short introductions for students only
- **Julianne** describes rules of written quiz

**11:10**

- **Students** begin written quiz around auditorium

**11:25**

- Parents and teachers enter auditorium
- **Emcee** Welcome Remarks, Schedule (including lunch plan), Contest Rules, Prizes, Sponsor Thanks

**1:00**

Review lunch plans (specifically seating), Top 10 finalist board to be displayed by 1:45, and further schedule- **Emcee**

**Final Round**- top 10 finalists, double-elimination

**1:00-2:30**

**Lunch**

**2:30**

- Brief welcome remarks, review final round rules **Emcee**
- Final Round

**~3:15**

- **Award Ceremony**
  - Awards distributed to 1<sup>st</sup> and 2<sup>nd</sup> place- **Emcee** (please receive certificates from a volunteer to the side of the stage)
  - Photo Op with trophy besides the Brain Bee sign
  - Recognition to sponsors- **Judge #1**

- Gifts to judges- **Judge #1**
- **Close of Program**

Welcome Statement:

- Brain Bee history/general information
- Significance of neuro education & research (especially in San Diego!)
- Thanks to the students for participating
- Introduce judges
- Brief overview of the event schedule
- Official rules for the First Round

General information about the SfN high school outreach program, the Brain Bee:

The Brain Bee is part of Brain Awareness Week, which was launched in 1996 by the Society for Neuroscience and the Dana Alliance for Brain Initiatives, with a mission to increase awareness of neuroscience in the general community. The Brain Bee is a not-for-profit neuroscience competition for high school students on the local, national, and international levels. Directed by founder Dr. Norbert Myslinski of the University of Maryland, the Brain Bee is an attempt to motivate students to learn about the brain, to capture their imaginations, and to inspire them to pursue careers in biomedical brain research. There are currently about 70 Local Brain Bee coordinators across four continents that conduct competitions annually. The winner of each Local Bee is invited to attend a National Brain Bee competition in his or her own country, and the winner of each National Bee is invited to compete in the International Brain Bee Championship.

Most local coordinators are neuroscientists at universities. Others are teachers and administrators from high schools, museums, and industry who are interested in science education and community outreach.

First Round Rules:

Participant order is randomly selected prior to event start.

All questions have been taken from the Society for Neuroscience publication "Brain Facts" and are randomly drawn from 3 boxes. Questions are assigned "least difficult", "moderately difficult", and "most difficult" by the SfN.

The event will be conducted in a manner similar to that of a spelling bee. When it is the participant's turn, they will approach the podium and be asked a question. Participants may request to have their question reread once. Following the final reading of the question, the participant will have 15 seconds to give their answer.

In the First Round, all participants will have the opportunity to answer a total of three questions separated into three rounds, as follows:

Round 1: 1 question per student (rated least difficult) each worth 1 point.

Round 2: 1 question per student (rated moderately difficult) each worth 2 points.

Round 3: 1 question per student (rated most difficult) worth 3 points.

At the end of these first 3 rounds of questioning, all scores will be tallied and the top ten competitors (more should a tie exist for the tenth position) will advance to the "Final Round".

#### Final Round rules only

The "Final Round" will be double elimination and the last competitor will be the official winner of the San Diego Brain Bee. Competitors will be asked 1 of the "least difficult" questions, followed by 1 of the "moderately difficult", while all questions after shall be randomly drawn from the "most difficult" box. After two incorrect answers, contestants return to the audience.

Format: One judge will be responsible for keeping time and asking the questions; one judge will raise a "Correct" sign; and one judge will raise an "Incorrect" sign. Judges are more than welcome to trade positions as they wish, perhaps for each of the three questioning cycles in the First Round. Judges may discuss whether a printed answer should or should not be the only correct answer, in case of advances in scientific knowledge since the "Brain Facts" publication and answers were written or a "close-enough" answer by the contestant, etc. Before asking a question, the timekeeper judge will refer to it by its number to allow the other two judges to find the corresponding question and answer in their packet. The timekeeper shall also begin the stopwatch after finishing the question, or after finishing the question a second time in case the contestant asks for the question to be repeated. Julianne will be responsible for keeping score and will be responsible for raising signs during the Final Round to signify whether the student has missed one or two questions. Upon the second miss, the student will return to their seat in the audience.

#### Lunch Plans

All students will receive a table assignment in their registration packet. Allow 5 to 10 minutes after the First Round before discussions will begin with neuroscientists and student volunteers over lunch. Lunches should already be delivered to the student tables as per meal preferences. Guests are welcome to take their lunches from the lunch table and find a seat at designated guest tables, where they will be joined by other neuroscientists and volunteers.

Also mention that the top ten finalists will be posted outside on the easel display within 30 minutes.

#### 1<sup>st</sup> Place Award

San Diego Brain Bee 1<sup>st</sup> place trophy  
\$500 gift certificate for the UCSD Bookstore  
2 round trip airline tickets to Baltimore for the National Brain Bee March 14<sup>th</sup>-15<sup>th</sup>  
2 nights' stay at a downtown Baltimore hotel for participation in the National Bee  
Mentorship by members of the San Diego Brain Bee committee to help prepare for the National competition

#### 2<sup>nd</sup> Place Award

\$100 gift certificate for the UCSD Bookstore  
Runner-up status for the National Brain Bee (will represent San Diego if 1<sup>st</sup> place winner is unable to compete)

## **BRAIN BEE BUDGET**

<u>Cost</u>	<u>Description</u>	<u>Person Responsible</u>	<u>Notes</u>
250.00	Mailings, postage, stationary, printing, envelopes, flyers, transparencies, etc		
75.00	National Brain Bee registration		
2,500.00	food & refreshments & rentals at event (based on 125 people attending)		
1,000.00	flight & hotel for winner & chaperone (based upon travel search engine estimate)		
470.00	t-shirts for contestants & staff/volunteers (72)		
80.00	engraved trophy		
600.00	1st Place \$500 Gift Certificate and Runner-Up \$100 Gift Certificate		
200.00	gifts for judges & sponsors		
100.00	goodie bags		
20.00	day-of-event signage		
90.00	programs and supplies		
1,000.00	Estimated Cost to operate Auditorium (cleaning, utilities, security)		
110.00	Parking Fees		
<b>6,495.00</b>	<b>TOTAL</b>		

### **Donations Description**

1,000	SfN local chapter grant (cannot be used for contestant prizes)
5,000	Company #1
2,000	Private Donor #1
1,000	Venue - cost to operate auditorium
<b>9,000</b>	



company name

date

company address line 1

company address line 2

Dear **Company** Sponsorship Division:

As a devoted customer in **Company**, I write you to let you know of an opportunity that may interest your company. The **Country** National Brain Bee is a nonprofit neuroscience competition for students in grades 9-12. The event is the major component of a new neuroscience outreach initiative by Ph.D. graduate students of the **Ph.D. program** of the University of **City** that attempts to motivate students to learn about the brain and become inspired to pursue careers in biomedical brain research. I invite you to participate as a sponsor of this event.

The **country** National Brain Bee is taking place at the University of **City** on Saturday, **date**. This event marks the first year that **country** joins nearly 30 other participating nations, spread across six continents. Participants are currently being recruiting from over 100 of the highest achieving schools across the country. In preparation, students are studying neuroanatomy, genetics, neuropathology, histology, and neurophysiology. The winner will advance to the International Brain Bee, this year being held in partnership with the **Congress** on **date** in **location**. The winner will be personally coached for the level of competition he or she will encounter in **month**.

We would be exceptionally grateful if you helped in sponsoring our event. **Company** would be recognized in press releases, displayed prominently on event T-shirts (provided for every student, judge, volunteer, and sponsor), and listed on the website ([www.website.org](http://www.website.org)), programs, and school mailings. Representatives of **Company** would be most welcome to attend so we may recognize and thank you personally for the gracious support. Forty students, their parents and teachers, graduate and medical students, neurologists, and neuroscientists will be in attendance, up to 150 persons in total. The cost to sponsor the educational program would be 3,250€. As the primary sponsor, you would enjoy increased name recognition and goodwill in the local and national research and educational communities as a result of supporting this event.

I would be most appreciative of a telephone call to inform me of your interest. I may be reached at **phone number** or via email at **email**. Thank you for considering this request and for continuing to support my own research.

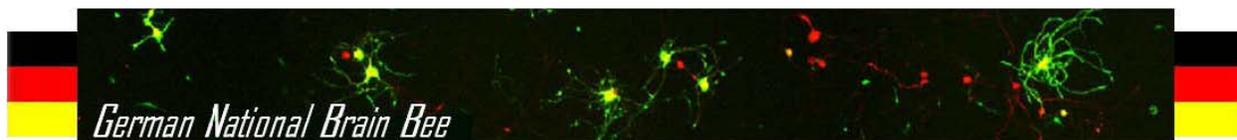
Sincerely,

**name**

**Country** Brain Bee Coordinator

**Ph.D. Program**

University of **City**



## Sponsorship Invoice

10<sup>th</sup> May, 2012

Sponsoring Organization:

Sponsoring Company

Address

Address

German National Brain Bee Committee

Address

Address

Tel: number

germanbrainbee@gmail.com

www.germannationalbrainbee.org

The German National Brain Bee Committee acknowledges and expresses appreciation to Company for the generous contribution to support the national neuroscience competition event, to be held on May 12<sup>th</sup> at Heidelberg University. Company will be represented as the Primary Sponsor on the website, programs, t-shirts, and other event materials. The funds will be used for the following purposes:

National Champion Prize Package (Travel to and accommodation in Cape Town, 100-Euro gift card, and an engraved trophy)	1.990,00
2nd-5th Place Prizes (in part)	80,00
Catering	430,00
Student Transportation	350,00
Printing	150,00
<b>Total Donation Amount:</b>	<b>3.000,00 Euro</b>

Please transfer the total of the sponsorship fund to the following account at your convenience:

Account Holder:      Name  
Bank Name:          Bank  
Account No.:        Number  
BLZ:                  Number  
Special Remark:    "Brain Bee"

Thank you for supporting an exciting event for the second time and making an impact on educating the young research scientists of the future. We are grateful for your thoughtful sponsorship and affirm that Company has received no goods or services in exchange for this contribution.

Sincerely,

signature

Name

German Brain Bee, Coordinator

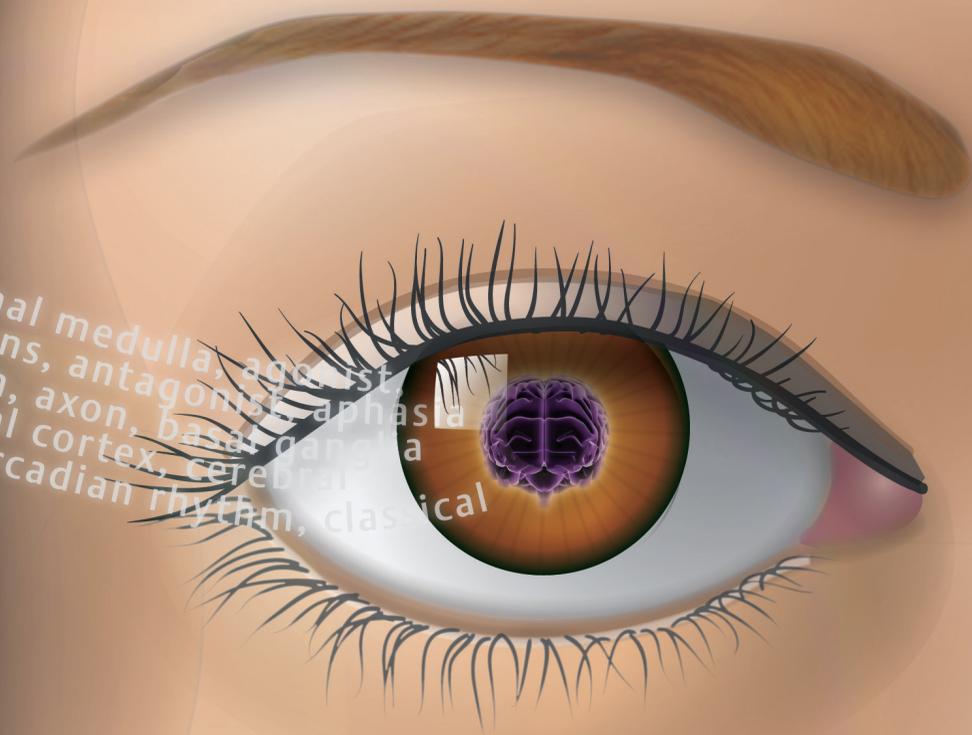
Affiliation

Location

# Australian Brain Bee Challenge 2012



acetylcholine, action potential, adrenal cortex, adrenal medulla, agerist  
disease, amino acid transmitters, amygdala, androgens, antagonist, aphasia  
apoptosis, auditory nerve, autonomic nervous system, axon, basal ganglia  
brain stem, brain s, broca's area, cerebellum, cerebral cortex, cerebral  
hemispheres, cerebrospinal fluid, cholecystikinin, circadian rhythm, classical



**out-smart out-think out-last**

Register now online: [www.abbc.edu.au](http://www.abbc.edu.au)

Registrations now open for 2012



A neuroscience education initiative established by the Queensland Brain Institute and the Faculty of Science

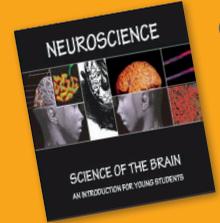
## Australian brain bee challenge

The Australian Brain Bee Challenge (ABBC) is the nation's only neuroscience competition for high school students. It is designed to excite, stimulate and support Year 10 students' interest in all areas of science and encourage them to pursue a career in this field.

Through a series of three *Challenges* and focused activities - including interactions with neuroscientists, tours/experiments in laboratories and lectures - students gain insights into working in the field of neuroscience and can explore potential career opportunities.

## Challenge your brain while having fun!

Students don't have to be a 'brain scientist' to enter - they will learn about neuroscience from a downloadable, information-packed book, called *Neuroscience: Science of the Brain*. Examples of questions they may expect can also be downloaded.



Questions for the Round 1 online Quiz are taken from this book.

**Download your FREE copy today at [www.abbc.edu.au](http://www.abbc.edu.au)**

## Round 1 online quiz

Students sit the 40 minute multiple-choice Quiz online at their school on a day and time to suit class timetables during Brain Awareness Week 12 March - 18 March or in the following week March 19 March - 23 March.

The ABBC tests student's knowledge of facts they have learnt from the free downloadable book, about topics such as intelligence, memory, emotions, sensations, movement, stress, ageing, sleep, Alzheimer's disease, stroke & other neurological disorders facing our community.



## Be challenged!

Students who score well in the Round 1 Quiz will be selected to progress to the Round 2 State Finals held at the Queensland Brain Institute, University of Queensland, for a fun-filled day of team and individual *Challenges* and activities.

The individual winners of each State Final progress to the Aus-NZ BBC National Finals. The two National Final Champions may have the opportunity to compete in the International Brain Bee competition overseas\*.



## Great prizes to be won

Students can win great prizes for their schools and themselves. Prizes include travel and accommodation for winning students and their guardian to attend the Round 3 National Final and the International Brain Bee competition overseas. \*(conditions apply).

## Registration is free – entry is easy

Teachers register their school including the number of students they anticipate might sit the Round 1 Quiz. Student names are not required for registration.

**Teachers may enter their whole Year 10 class or less, for this great experience.**

**For more information or to register visit [www.abbc.edu.au](http://www.abbc.edu.au)**

\*See Condition (5) at [www.abbc.edu.au/rules.php](http://www.abbc.edu.au/rules.php)

## Important dates

**registrations** Register before 24 December 2011 to go into the draw for some great prizes.

**round 1 online quiz** 12 March - 23 March 2012 to suit class times

**round 2 state finals** 19 June 2012 Queensland Brain Institute, QLD

**round 3 national final** 3 Feb-6 Feb 2013 Melbourne, VIC

**ABBC National Coordinator**  
**Professor Linda Richards**  
Queensland Brain Institute  
The University of Queensland

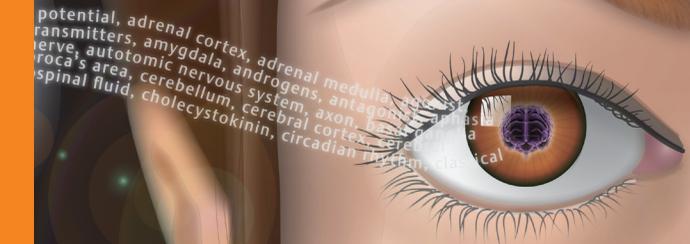
**For enquires, please contact**  
**Katherine Wilkins**  
ABBC National Administrator  
Queensland Brain Institute  
The University of Queensland

**Phone** 07 3346 6412  
**Email** [abbc@uq.edu.au](mailto:abbc@uq.edu.au)  
**Website** [www.abbc.edu.au](http://www.abbc.edu.au)

## Established by



A neuroscience education initiative established by the Queensland Brain Institute and the UQ Faculty of Science



**out-smart out-think out-last**

# Australian Brain Bee Challenge

# 2012

How Year 10 Students can move towards a **CAREER IN SCIENCE**

[www.abbc.edu.au](http://www.abbc.edu.au)

# Australian Brain Bee Challenge (ABBC)

The Australian Brain Bee Challenge (ABBC) is a competition for high school students in year 10 (Australia) and 11 (New Zealand) to learn about the brain and its functions, and to dispel misconceptions about neurological and mental illnesses.

The program was started in Australia in 2006 to address a number of deficiencies in the public's perception of science, and neuroscience in particular. The ABBC provides current and accurate information on the latest advances in neuroscience research, its value to the community, and promote careers in science and technology.

The program gives students the opportunity to learn about the brain, learn about neuroscience research and find out about careers in neuroscience. Although targeted at high school students, their parents and teachers, the ABBC is a community outreach initiative that highlights scientific issues and science as a profession to the wider community through advertising associated with the competition, through additional public activities that occur during Brain Awareness Week, and by ongoing research opportunities for teachers and students.

## The ABBC Aims:

- 1) to highlight what the brain does, how it functions and how important it is to everything we do and who we are as human beings. Simple knowledge of this nature provides self-esteem, dispels superstitions and misconceptions (for example topics such as where emotions reside), and explains the importance of enhancing your brain's potential through learning, exercise and avoidance of illicit drugs.
- 2) to educate teachers and students on the latest scientific findings and to explain how important research and discovery is to our community, as well as to generally improve scientific literacy in our community.
- 3) to provide opportunities for students from remote areas of Australia and New Zealand to participate in the competition and to challenge all students to consider a career in Science and Neuroscience in particular.

## Work experience at the Queensland Brain Institute (QBI)

Several students who participate in the ABBC are offered work experience at QBI. QBI is a brand new facility that has 33 laboratories studying many different aspects of neuroscience. There are more than 280 dedicated neuroscientists working to improve the understanding of how the human brain operates. The researchers work under the guidance of 33 laboratory heads, each world-renowned investigators in their field. These groups work across seven research themes.

Work experience allows students to have an opportunity to be in a lab environment, talk to and work with neuroscientists and experience something they would not normally be exposed to. Already, as a result of the ABBC, many students are participating in work experience in different neuroscience laboratories around Australia. Students from the 2006 competition have just completed their third year of University and we currently maintain contact with these, and all our students, through our Alumni program. A number of these students have gone on to continue working at QBI whilst studying for an undergraduate degree at the University of Queensland. The Alumni database includes contact details for the thousands of students' nation-wide that have participated in the brain bee at the round one level. This database can be used for education outreach, career information and opportunities.

A quote from Nina Ruzsiscka -NT State Champion and QBI Work Experience Participant- *"The ABBC and Work Experience at QBI was the most intriguing and interesting science experience I have ever participated in. Exploring the labs dedicated to various areas of neuroscience was exiting; and most of the objects we interacted with, I had never seen before! Just being inside QBI allowed me to expand my knowledge and understanding of neuroscience; research, diagnosis and experimentation. The most interesting times were when we could watch or participate in activities conducted throughout the labs. Coming and staying at the University of Queensland has inspired me to study hard and hopefully come back to UQ as a permanent student in the near future!"*

## The Profile of the Competition

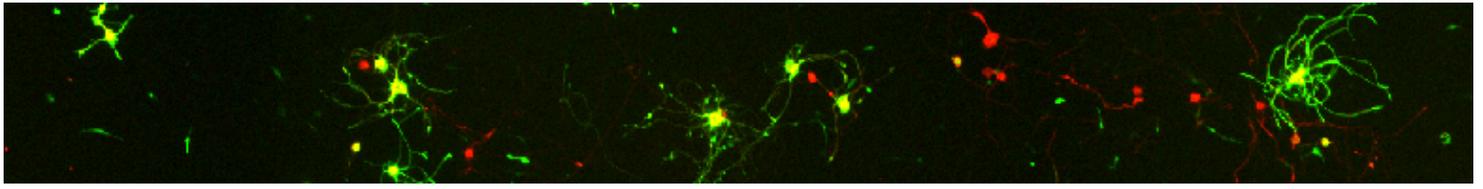
The national and international nature of the Brain Bee Competition has raised the profile of Neuroscience worldwide. The competition has attracted a huge amount of media attention including television, newsprint and radio coverage around Australia and New Zealand. The first ABBC was held in Queensland and Northern NSW in 2006, with 240 students taking part. The ABBC has continued to expand over the last 5 years with 5669 students from 294 schools participating in the 2011 competition.

### ABBC Participants 2006-2011

Year	Schools	Participants
2006	85	240
2007	141	740
2008	272	4212
2009	359	3200
2010	378	4526
2011	294	5669

Through the ABBC we are attracting highly motivated students, interested in neuroscience, to leading Universities around Australia and New Zealand.

The Queensland ABBC State Final was held on July 19<sup>th</sup> at QBI. 140 students from all over Queensland had the opportunity to come to QBI, tour the facilities, talk to neuroscientists and participate in lectures. Student and teacher feedback from the day was very positive and the day was a big success. The program for the Queensland Final is below.



# *German National Brain Bee 2012*

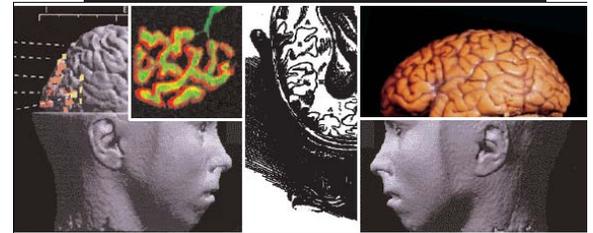
Dear Science Teacher or Administrator,

We would like to invite your students to participate in an exciting, challenging, and fun-filled event: the 2nd Annual German National Brain Bee Competition. The event will be held on Saturday, May 12<sup>th</sup> from 13:30 – 17:30 at the University of Heidelberg. In addition to the competition, all students will have the opportunity to speak with professors and graduate students from the medical, biosciences, and neuroscience fields.

## **What is the Brain Bee?**

The Brain Bee is a live Question & Answer competition that tests students' knowledge of neuroscience. The best young brains around the world are quizzed about the brain and how it relates to intelligence, memory, emotions, sensations, movement, stress, aging, sleep, and neurological disorders. All of the questions are derived from “Neuroscience: Science of the Brain”, published for public youth education by the International Brain Research Organization. The winners of each national Brain Bee across the six participating continents will have the opportunity to travel to Cape Town, South Africa in July for the International Contest, where they will be recognized during the International Psychology Association conference.

**NEUROSCIENCE**



**SCIENCE OF THE BRAIN**  
AN INTRODUCTION FOR YOUNG STUDENTS

## **How does it work?**

Typically, there are local Brain Bee competitions representing each region or state. Respective coordinators contact schools in the area for interested students and help to prepare the students with study materials and guidance. The winner of each local competition is then invited to the National Competition and may also compete in the International Brain Bee later in the year. Neuroscientists will serve as judges for the event, with graduate and medical student volunteers moderating break time discussions with guest neuroscientists from research and teaching institutions.

## **The German National Brain Bee**

This year, there are almost 150 local Brain Bees occurring around the world. Since this is the second year of the Brain Bee in Germany, there is only one event: the National Competition. It is open to any student in grades 9 to 12 and is limited to the first 40 students that submit their information via email (more information below). Four Sections make up the contests: two Podium Rounds, where the judges verbally ask questions to each student, a short Written Quiz, and a basic Neuroanatomy Practical, using brain models and tissue sections via microscope. In the future, there will also be several local competitions in different regions of the country.

This year's first place winner of the German National Brain Bee will be awarded a trophy, 1.500€ for two round-trip flights (for the student and a parent escort) to the International Competition in Florence from July 14<sup>th</sup>-18<sup>th</sup>, 200€ to contribute to hotel costs, and a 100€ gift card to Amazon.de. 2nd - 5th place winners will also be awarded Amazon gift cards. All participants will receive event t-shirts, and the German National Brain Bee Committee will send out press releases to local newspapers reporting their successes. All students will also receive a Certificate of Participation and souvenirs from Heidelberg University.



The 2010 International Brain Bee contestants at the American Psychological Convention in San Diego, California.

### **The International Brain Bee**

Every year, the competition grows more challenging, not only for the students but also for the judges! Last year, students traveled from twelve countries and six continents to Florence to attend the International Brain Research Organization conference and to be quizzed on such topics as intelligence, emotions, consciousness, sensation, movement, brain imaging, and brain disorders, such as Alzheimer's, Parkinson's and mental retardation. This year's International Brain Bee will be held in Cape Town, South Africa in partnership with the annual meeting of the International Psychology Association from July 14<sup>th</sup> - 18<sup>th</sup>. The first place winner will receive a \$3,000 scholarship, an individual trophy, a traveling trophy that is held by the annual winner's high school, and a summer internship with an esteemed neuroscientist from the Society of Neuroscience. The second and third place winners will receive prize packages as well: \$2,000 and \$1,000 scholarships, respectively. More information is available on the website: [www.internationalbrainbee.com](http://www.internationalbrainbee.com).

*We are most honored to invite your students to participate in the  
German National Brain Bee.*

#### **How can students register?**

If your students are interested in participating, we request that each student register by Friday, March 30<sup>th</sup>. Registration is complete upon receipt of an email to [GermanBrainBee@gmail.com](mailto:GermanBrainBee@gmail.com) with the following information, also listed on the website at [www.germannationalbrainbee.org/Register](http://www.germannationalbrainbee.org/Register): Name, School, Grade/Year, Email Address, Phone Number, Mailing Address, T-shirt Size (adult sizes), Science Teacher's Name and Email Address, and the number of guests planning to attend the event on May 12<sup>th</sup>.

All questions for the Bee will come from the downloadable booklet *Neuroscience: Science of the Brain*, published by the International Brain Research Organization. Students should visit the website to find the materials and begin studying for the event: <http://germannationalbrainbee.org/prepare/>.

Transportation to the event will be the responsibility of the schools and individual participants. Directions to The Spinal Cord Injury Center, located in Heidelberg and accessible by the Orthopädie S-bahn Station, can be found via the links on the German Brain Bee website. Participation in this event is free, and snacks and beverages will be provided during the competition. Teachers and family members are also encouraged to attend the competition. If you have any questions, please feel free to contact the coordinators at [GermanBrainBee@gmail.com](mailto:GermanBrainBee@gmail.com).

Remember, the registration deadline is Friday, March 30<sup>th</sup>.

The Brain Bee is an attempt to motivate our youth to learn about the brain, capture their imagination, and inspire them to pursue careers in brain research and medical practice. We hope you will be able to participate in this second year of competition in Germany.

Thank you for your time. We very much hope to see you at the Brain Bee!

Best regards,

The German National Brain Bee Committee  
[www.germannationalbrainbee.org](http://www.germannationalbrainbee.org)

**Professor Linda Richards**  
Australian Brain Bee Challenge  
National Coordinator  
Queensland Brain Institute  
The University of Queensland  
Building (79) St Lucia, QLD 4072  
Telephone +61 7 3346 6412  
Facsimile +61 7 3346 6301  
Email [abbc@uq.edu.au](mailto:abbc@uq.edu.au)

11 October 2012

Dear Science Teacher,

### **The Australian Brain Bee Challenge (ABBC) 2012**

The ABBC is Australia's only neuroscience competition for high school students. It is a competition that teaches students about the brain and how it functions and dispels misconceptions about neurological and mental illness. It tests the neuroscience knowledge of students on topics such as intelligence, memory, emotions, movement, stress, ageing, sleep, addiction, Alzheimer's and stroke. In 2011, there were 5629 student competitors from 294 schools across Australia and New Zealand. We would love for your school to be a part of the ABBC in 2012!

The ABBC is for Australian students enrolled in Year 10 in 2012. It's free and you can enter as many students as you like. Students can win fantastic prizes for themselves and their school.

#### ***2012 Registrations now open!***

To register go to the ABBC website- [www.abbc.edu.au](http://www.abbc.edu.au)

- **Round 1- March 12<sup>th</sup>- 23<sup>rd</sup> 2012**

An online multiple-choice Quiz held during Brain Awareness Week (March 12<sup>th</sup>-18<sup>th</sup>) and the following week (March 19<sup>th</sup>-23<sup>rd</sup>). All questions are based on material from the book *Neuroscience: Science of the Brain* which can be downloaded from the ABBC website.

- **Round 2- June 19<sup>th</sup> 2012**

The Queensland and Northern Territory State Final is held at the Queensland Brain Institute (QBI), University of Queensland (UQ). Queensland and Northern Territory students who score well in Round 1 will be invited to attend the Queensland and Northern Territory State Final. As well as competing to become the ABBC Northern Territory Champion, students also have the opportunity to tour the fantastic facilities at QBI and UQ, meet neuroscientists and researchers and participate in experiments and lectures. All questions are based on material from the book *Brain Facts* which can be downloaded from the ABBC website.

The Northern Territory State Final has been held with the Queensland State Final since 2009. 4 Northern Territory students and an accompanying guardian are invited to come to Queensland to participate in the State Final. The 4 students are also offered 3 days of work experience in the QBI laboratories. Flights and accommodation for these students and guardians are provided.

- **Round 3- February 3<sup>rd</sup> - 6<sup>th</sup> 2013**

The Australian- New Zealand National Final gives each of the State Finalists the opportunity to compete to become the ABBC Australian Champion. The ABBC Australian Champion will then represent Australia at the International Brain Bee Challenge held at an international location to be determined in 2013. (Terms and Conditions Apply)

To register for 2012 or for more information about the ABBC, please go to [www.abbc.edu.au](http://www.abbc.edu.au), or contact the ABBC National Administrator, Katherine Wilkins via email [abbc@uq.edu.au](mailto:abbc@uq.edu.au) or phone 07 3346 6412.

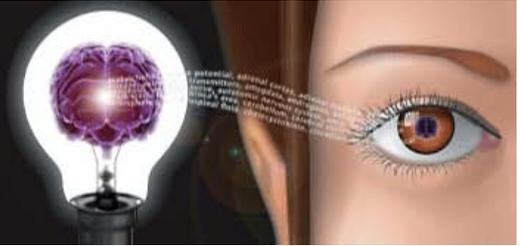
Sincerely,

Professor Scientist

Australian Brain Bee Challenge National Coordinator

## Australian and New Zealand Brain Bee Challenge

# 2012

**out-smart out-think out-last**

### Queensland and Northern Territory State Final 2011

The 2011 NT ABBC Champion was Nina Ruzsicska, from Darwin High School.

# NT's brainiest in battle

A DARWIN High School student will battle it out against seven of the smartest youngsters in the country after winning the Territory final of the Australian Brain Bee Challenge.

Nina Ruzsicska, 15, defeated hundreds of students to make it to the NT finals.

She then beat Ashail Silva from Casuarina Senior College, Tara Guempel-Crothers from Katherine High School and Callum Le Lay from Taminin High School in the joint Queensland and Territory finals in Brisbane.

Nina will now go to the national final on the Gold Coast in January.

Questions were taken from information presented in *Brain Facts*, a booklet produced by the American Society for Neuroscience, which also prepares university-grade textbooks for students studying neuroscience.

Nina, a Year 10 student, said she had always been interested in the functions of the brain.

"Anything to do with neuroscience, like how different areas of the brain function, different diseases and other stuff like that," she said.

The questions were posed to the students in front of a live audience.

Nina described the experience as "nerve-racking".

"I wasn't sure how things would turn out," she said.

"They would ask me the question and for a moment I wouldn't be sure about the answer, but then it would come to me - then I would be worried if it was wrong."

Nina and the three other students were selected to go to the NT finals based on results of an online quiz.

She said she wanted to study medicine after school and become a doctor.

"But I need to work hard for that and get a really high Australian Tertiary Entrance Rank to be accepted."

"I need to be somewhere around 99 - and that seems very high.

"I just hope I can achieve it," she said.

The national winner will represent Australia at the International Brain Bee Championships.



**I need to be somewhere around 99 - and that seems very high**



NT Brain Bee champion Nina Ruzsicska with Queensland Brain Institute director Professor Perry Bartlett

Media clip from Northern Territory News- 9<sup>th</sup> August 2011

Nina also participated in the work experience program at QBI and had this to say about the experience- "The Australian Brain Bee Challenge and Work Experience at the Queensland Brain Institute was the most intriguing and interesting science experience I have participated in. Just from being inside of QBI allowed me to expand on my knowledge and understanding of neuroscience; research, diagnosis and experimentation. It was a mind opening experience and has inspired me to study hard".

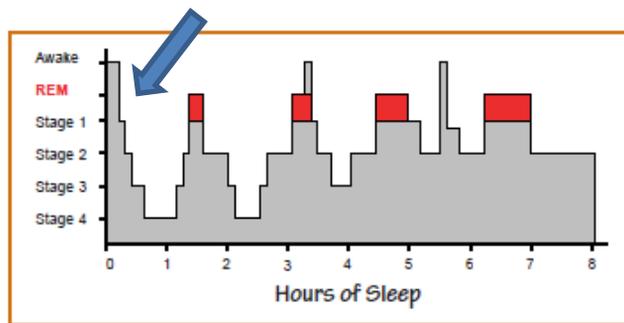
# 2011 German National Brain Bee- Written Section

Name \_\_\_\_\_

1. Working memory refers to memory that is maintained in consciousness for some short period of time, perhaps for the purposes of manipulating it. Using this type of memory is primarily associated with activation of:
  - a. the frontal lobe
  - b. the parietal lobe
  - c. the occipital cortex
  - d. the hippocampus
  - e. a and b
  - f. a and d

2. Referring to the figure below (arrow), what stage of sleep occurs during the 1<sup>st</sup> hour?

- a. REM sleep
- b. Atonia
- c. Slow wave sleep
- d. a and c



3. What are the small protuberances that extend from the dendrites, as shown in this image below?

- a. synaptic vesicles
- b. metabotropic receptors
- c. Meissner corpuscles
- d. dendritic spines



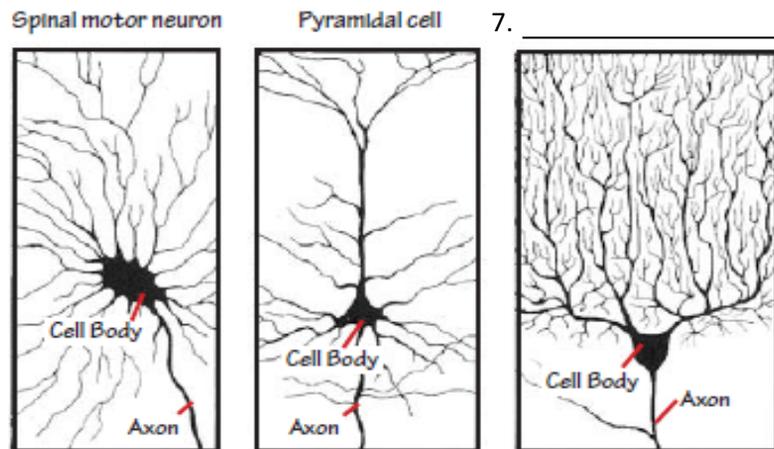
4. - 6. Please label the structures identified below:

4. \_\_\_\_\_

5. \_\_\_\_\_

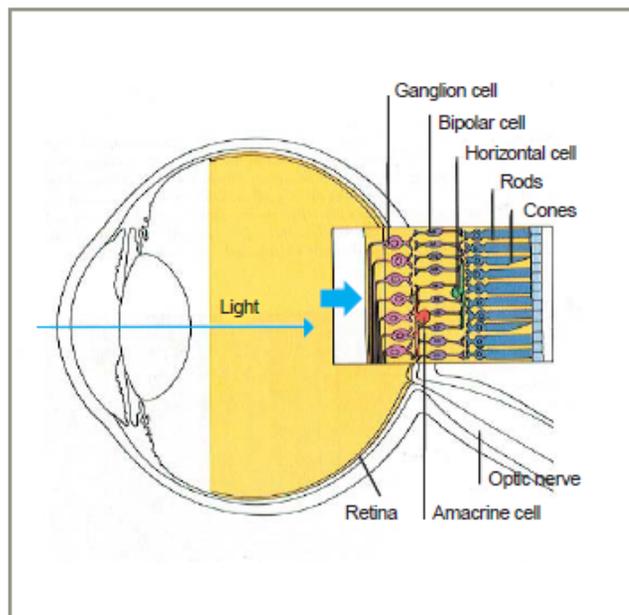
6. \_\_\_\_\_

7. What type of neuron, located in the cerebellum, is shown in the right panel?



8. The axons of which cells are bundled together to form the optic nerve?

- a. rods
- b. cones
- c. ganglion cells
- d. amacrine cells
- e. a and b

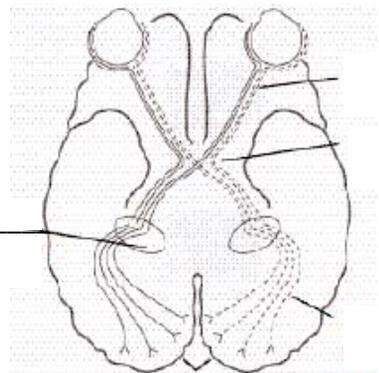


9. Which glutamate receptor is the fastest to respond to the neurotransmitter to produce an excitatory post-synaptic potential?

- a. NMDA
- b. AMPA
- c. kainate
- d. mGluR

10. \_\_\_\_\_

10. Please label the nucleus in the brain (identified by the line above) that serves as a relay station for processing visual information.



# Sample Neuroanatomy List

## Gross Anatomy

### Whole brain specimen:

Dorsal and lateral surface:

- Frontal, temporal, parietal, occipital lobe
- Lateral sulcus (Sylvian fissure) and insular cortex
- Central sulcus (fissure of Rolando), pre- and post-central gyri
- Cerebral longitudinal fissure
- Cerebellum
- Brainstem
- Crus cerebri
- Central sulcus
- Primary motor cortex: located in precentral gyrus
- Somatosensory cortex: postcentral gyrus

Ventral surface:

- Medulla
- Pons
- Mammillary bodies
- Infundibulum
- Optic chiasm and nerve
- Cerebral peduncles
- pyramids

### Midsagittal cut brain specimen:

- Telencephalon, diencephalon, mesencephalon, rhombencephalon, cerebellum
- Thalamus, hypothalamus
- Mammillary bodies
- Tectum (superior and inferior colliculus)
- Pons and medulla

### Ventricle Models and Midsagittal cut brain specimen:

- Fourth ventricle and choroid plexus
- Foramen of Monroe
- Medullary velum
- Cerebral aqueduct
- Third ventricle
- Lateral ventricles

### Coverings of brain:

- Dura
- Arachnoid

### Circulatory System

- Superior sagittal sinus
- Circle of Willis
- Basilar artery
- Vertebral arteries

### **Horizontal section**

Internal capsule

### **Coronal section**

Substantia Nigra

Basal ganglia (putamen, globus pallidus, caudate nucleus)

### **Cranial Nerves**

<http://www.gwc.maricopa.edu/class/bio201/cn/cranial.htm>

Potential questions:

Identify this structure/gyrus/part of the midbrain/space/nerve/round structure/artery that feeds this part of the brain/thick membrane/circular system of blood vessels/area connected to the pituitary gland/fine meninges closest to the brain/major sulcus/gyrus/major function of this major cortical lobe/crossing of nerves (optic chiasm)/area of the brain associated with brodmann area 22/44,45

## 2012 International Brain Bee Championship

### Patient Actor Instructions

<u>Disorder</u>	<u>Patient Actor Name</u>	<u>Station</u>
Tourette Syndrome		A
Parkinson's Disease		B
Alzheimer's Disease		C
Bipolar Disorder		D
Huntington's Disease		E
Schizophrenia		F
Epilepsy		G
Addiction		H
Stroke		I
Autism		J
Neurological AIDS		
Chronic Pain		

**High school students rotate through 10 stations spending 4 minutes alone at each station with a patient actor. Each actor plays the part of a patient with one of 10 neurological disorders. The goal of each student is to correctly match each actor with their correct disorder using the list of 12 disorders above. By listening to the patient, observing them, asking them 3 questions, and ordering 2 laboratory or clinical tests, they are to diagnose the patient's neurological disorder, choosing from one of the above 12 disorders. Patients are only allowed to answer "yes", "no" or "I don't know" to the 3 questions. Remember, a patient is answering these questions, and the patient does not have a medical background. Students will select 2 tests from a list of tests and will immediately be given the results to help their diagnosis. The actor will now be a lab technician and will immediately have the results of the tests. The tests the student can choose from are the following:**

Blood Test

Memory Test

Intelligence Test

Sensory Evaluation

Motor Evaluation

CT Scan

Cerebral Blood Flow Studies

X-ray

MRI

Reflex Evaluation

Vital Signs

Nerve Conduction Test

Electromyogram

Electroencephalogram

Lumbar Puncture

DNA test

Functional MRI

Blood Pressure Measurement

Actors must be ready to give a 2-minute history of their problem, and act out the symptoms of their problem (if appropriate). Actors will have to do this 12 times, one for each of the competitors (24 if they have 2 disorders). Actors must also know the results of each of the above tests for their neurological problem. If the results would be negative, the actor only has to say that the test did not show anything. If the test was positive, the actor should be able to give the results in general terms. For example: the test found a tumor in the right temporal lobe; the test found a defect on chromosome 21; the test found a numbness in the right hand; or the test showed abnormal brain waves in the left parietal lobe.

Sample brief registration confirmation email

Hello **Name!**

Thank you so much for your registration and congratulations on deciding to compete in the **country** National Brain Bee! This email serves as confirmation of your registration, and we are excited to have you join us.

Attached is the Study Guide with the neuroanatomy material, patient diagnosis section and helpful tips for studying. If you have not already done so, in addition, you can download and begin looking through the 'Neuroscience: Science of the Brain' booklet on the Prepare tab of the website or by clicking here: **website**. As the event date nears, we will be updating you with further information regarding the program. Until then, do not hesitate to ask me any questions about the material or the event- I am happy to help!

Kind regards,  
**name**

Hello Brain Bee participant!

First of all, we are so excited that you will be a part of the Inaugural San Diego Brain Bee event- thank you so much for your interest. We asked every teacher across San Diego county (all 146 high schools!) and you are among the pool of 40 students that rose to the top of the stack of nomination forms- congratulations! While you are most certainly a talented and motivated student (you wouldn't be getting this email if you weren't!), the Brain Bee competition is meant to be a fun and relaxed event, so no worries for now- you will have a great time!

I wanted to touch base with you in particular to make sure we have all of your information and, in return, let you know about the review session we'll be hosting at The Neurosciences Institute (NSI; <http://www.nsi.edu/index.php>) for any student interested. Like the letter that was sent to your high school indicated, all competition questions are taken directly from the Brain Facts (2006 Edition) booklet, attached to this email. There are about 52 pages of actual material and it's written in a way for the general public- you're not expected to be a neuro expert quite yet!

The review session will be held on Saturday, January 24th, from 1-3pm, snacks provided. I and two others will be giving a brief presentation to walk you through the general topics covered in Brain Facts, and will go into detail to answer specific questions asked by you students. We'll also provide some sample questions and review the rules of the Brain Bee event. I've attached a map with directions. The address is 10640 John Jay Hopkins Drive, San Diego, 92121. Please let me know if you will be able to come no later than Wednesday, the 21st, so we can prepare the room and food for the appropriate number of people. There will be signs directing you to the large conference room, where we will be meeting promptly at 1. Feel free to call me at [858.245.9455](tel:858.245.9455) if you're having difficulty finding the place.

The rules of the competition are quite simple: The First Round will give every student the opportunity to answer three questions: a least difficult, moderately difficult, and most difficult question each, which are valued at 1, 2, and 3 points, respectively. All students will be sitting up on stage and will approach the podium to answer each question, which will be posed by the uber-friendly panel of three judges. Essentially, by the end of the First Round, you will have been at the podium three times. The Final Round will begin after lunch with the top ten finalists, according to the points accumulated during the First Round. After all students answer a least difficult, and then a moderately difficult question, all further questions will be ranked "most difficult". The format will be double-elimination. The last remaining contestant on stage after all others have missed two questions each will be our Brain Bee winner!

Now, for what you've been waiting for.... (drum roll, please).... the 1st place winner will receive a \$500 gift certificate to the UCSD Bookstore (books, computers, iPods, cameras, clothing, stationary, art supplies, and gifts make up this fabulous establishment: <http://bookstore.ucsd.edu/>), a trophy definitely worth passing down to your grandkids someday, two roundtrip tickets to Baltimore in March, two nights' stay at a downtown hotel, and the experience of representing San Diego County at the National Brain Bee. The second place winner will receive a \$100 gift certificate for the Bookstore and will serve as the runner-up for the National Brain Bee in case the 1st place winner is unable to attend. Mentorship will be provided by myself and the committee to help you study for the National Bee. All students will receive an official Brain Bee t-shirt (you'll actually WANT to wear this one!), an authorized certificate of participation, and some other goodies. As well, press releases will be sent to all local newspapers informing them of your participation. The San Diego press is also planning to cover the event, so look for a photo in the paper after the event!

From one who has actually been a high school contestant (in Ohio) and was lucky enough to place 3rd at the International Brain Bee back in 2002, I must tell you that it's all a really great program and a fabulous addition to your resume (I didn't get into UCSD's Biomedical Neurobiology PhD program from grades alone!). I know you're probably really busy with school and extracurriculars, but to participate in something like this that is different from anything else you've done is always a fun experience and definitely sets you apart on any application you may submit in the future. We've coordinated with over a dozen internationally-acclaimed neuroscientists, such as Terry Sejnowski (computational neurobiology; Salk), Doug Nitz (hippocampal circuitry; NSI), and Nick Spitzer (embryonic neural development; UCSD), to come to the event and even share lunch with all student participants. At each table of 8, there will be one neuroscientist, one college, graduate, or medical student, and 6 high school students. That'll be your chance to ask and learn about cutting-edge research, modern techniques and technology, college applications, or generally what it's like to be a scientist... whatever your heart desires! These are all pretty cool people, so you're in for a real treat!

Registration for the Brain Bee will open at 10:40am on Saturday, January 31st and the event will begin at 11:00 in the Auditorium at NSI. The awards ceremony will end by 3:30. Lunch will be provided from 1:00-2:30 for all students and guests. Speaking of lunch, I need you to confirm how many people you will be bringing (not including yourself) and whether any of them are vegetarian. It'd also be nice to have their names, so they, like you, can also have a fancy, pre-typed name tag. I've attached the Nomination Form- please fill this out immediately and return to me in an email (you can also just email the information, instead of attaching a file).

Don't hesitate for a minute in asking a question... that's what I'm here for, from directions to NSI to specific neuro questions you have from studying to what kind of lunch you have to look forward to on the 31st.... ask anything! I do expect to hear from you by this Wednesday with your registration information as well as your RSVP for the review session- please don't be late with this- otherwise, I may just have to give you a call! For further information about the Brain Bee in general, including sample questions and such, check out [www.internationalbrainbee.com](http://www.internationalbrainbee.com).

Have fun reading Brain Facts and I look forward to meeting you in the coming weeks!

Best,

Julianne

San Diego Brain Bee Committee

This Brain Bee(c) is an officially sanctioned event of The International Brain Bee(c) All rights reserved.

Sample one-week-before email to students

Hello to all you outstanding Brain Bee participants!

First of all, thank you for choosing to participate in the **country** National Brain Bee! You should all be quite proud to be among the first participants in the country to join a community of tens of thousands of students around the world who have competed in a Brain Bee. Congratulations on taking advantage of a great reason to learn something new and interesting, meet people who are studying and working in the neuroscience field, and enjoy the great event that we have planned for you! Remember that the day is meant to be a fun, friendly contest, so don't stress too much!

As always, I am very happy to answer individual questions if you have any. In addition to the great prizes for 1st-5th-place winners, every student will receive a gift bag with an awesome t-shirt, **city** University souvenirs, and unique biomedical research goodies. As well, you will each receive a Certificate of Participation and be able to add this activity to your resume, which will help once you start applying to universities.

As stated on the website, registration will open at 13:30 and the Welcoming Remarks will commence at 13:45 in the Auditorium at the **venue** in **city** (signs to the area will be posted at the Main Entrance). The dress code is casual, and you are even encouraged to wear the Brain Bee t-shirt (bright orange/yellow color) that you will receive upon arrival. Also, come hungry- we will have a lot of delicious snacks waiting for you!

While you are participating in the competition, your guests will have the opportunity to visit a couple neuroscience booths that will explain some of the great phenomena of the brain, including a small experiment on your taste buds and a simulation of the electrical impulses driving your neural circuitry. I guarantee you'll love it! You will also have a chance to talk to the graduate and medical students and professors who will be standing by eager to talk with you about university, medical research, and future careers in science!

For those of you traveling by public transportation, there is an S-bahn station at the clinic, appropriately named "**train station**". For those driving, the address is **address**. Follow the drive up the hill to the parking garage entrance, where you will receive a parking ticket. Parking passes to cover the parking fee will be available at the registration table. There is a good chance that one of our generous sponsors will be able to support ALL students' travel expenses, so please keep your receipts and train tickets- I will announce the final status by Thursday evening.

Once again, if there are any questions, do not hesitate to email, call, or SMS name: **phone number**.

We look forward to seeing you soon for this exciting event!

Sincerely,  
the **country** Brain Bee Committee

## 2011 German Brain Bee Competition Study Guide

### *Neuroscience: Science of the Brain*

All questions are formatted to require answers that are either one word or a short phrase.

Example 1: "Sensory neurons are coupled to what macromolecules on cell membranes specialized to detect and respond to the internal and external environment?" -- Receptors

Example 2: "Name the simple test used to determine the differences in sensitivity to touch in different parts of the body." --Two-point discrimination test

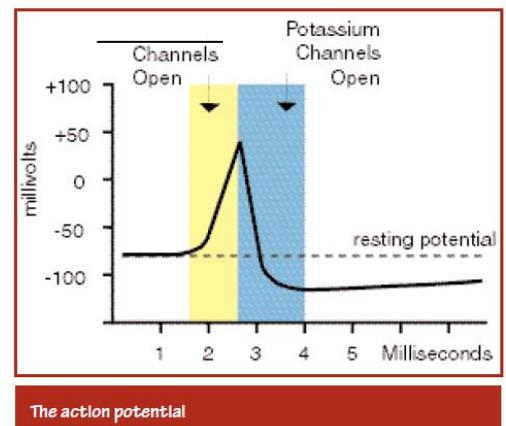
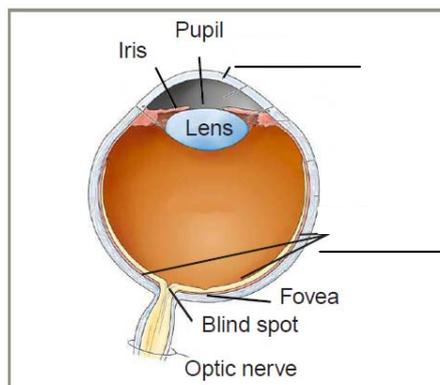
### **Podium Section** General Rules:

- Each student may ask to have the question repeated once.
- Each student has 15 seconds to respond to a question. If the question is repeated, the timer is stopped while the question is being spoken.
- You may not give more than one answer, but the judges may ask you to clarify, in case your answer is too general.

The **Written Section** will use some images from the booklet to ask questions.

Example 1: During an action potential, which ion channels are the first to open?

Example 2: Label the missing structures of the eye:



### Tips:

- You will not be asked to define acronyms, like GABA, NMDA, or MRI.
- You will not be asked about historical events or particular scientists or experiments.
- You may be asked to identify items within images only on the following pages: 3-5, 14, 15, 20, and 39.
- Most questions will focus on the following topics: neurotransmitter characteristics and roles, qualities of a neuron and an action potential, diseases and therapies, how the senses work, brain regions and general functions, sleep stages, clinical imaging and recording devices, and different types of memory.
- Take a deep breath- you can do this! 😊

## Neuroanatomy Section

Be able to identify the following structures on the human brain models:

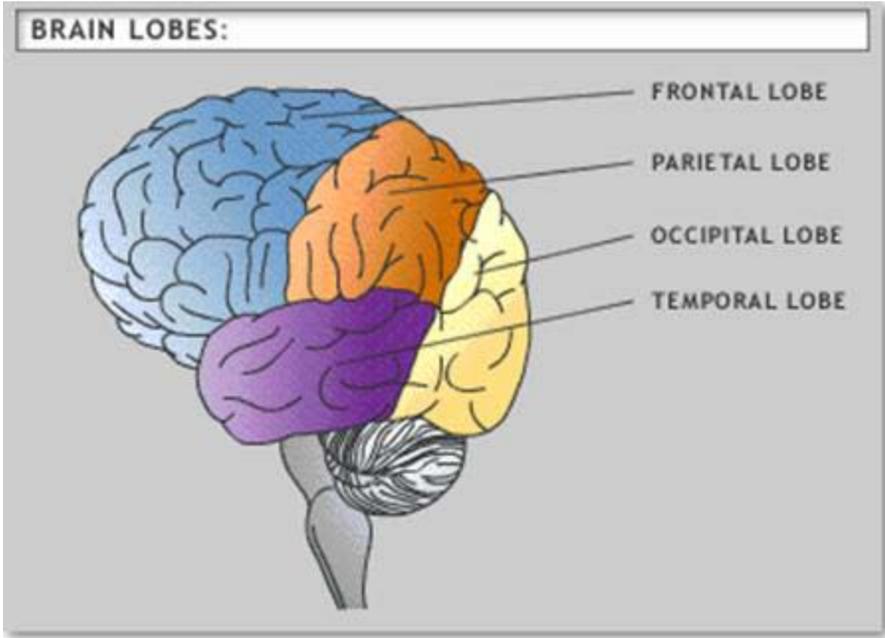
- Frontal, temporal, parietal, and occipital lobes
- Lateral sulcus
- Central sulcus
- Cerebral longitudinal fissure
- Cerebellum
- Brainstem
- Medulla
- Pons
- Mammillary bodies
- Optic chiasm
- Hypothalamus
- Thalamus
- Mammillary bodies
- Lateral ventricles
- Olfactory Bulbs
- Motor Cortex
- Sensory Cortex
- Pituitary Gland
- Corpus Callosum
- Spinal Cord

There will be 4 microscope slides each with a thin piece of the following tissues that you will need to identify:

- Cerebellum
- Cortex
- Hippocampus
- Spinal Cord

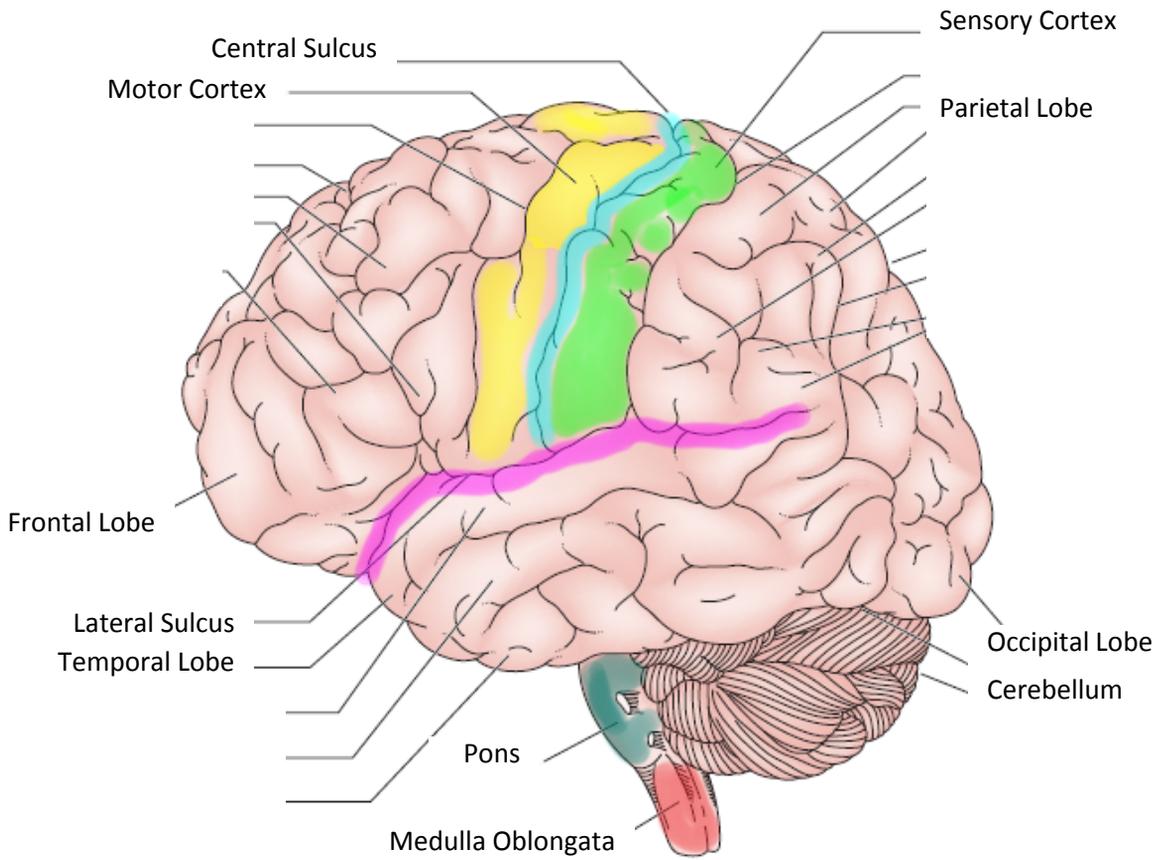
### Neuroanatomy Section tips:

You will only be asked to label the structure, not define its function or its relation to other structures. Some *questions* may include the function or circuit, such as, "Name this structure, which is very important as a relay station for sensory input." or "Visual information is transmitted from each eye via the optic nerves and crosses from one side of the body to the other at this structure." So, knowing the function of each structure listed above may help you during the Neuroanatomy Section.

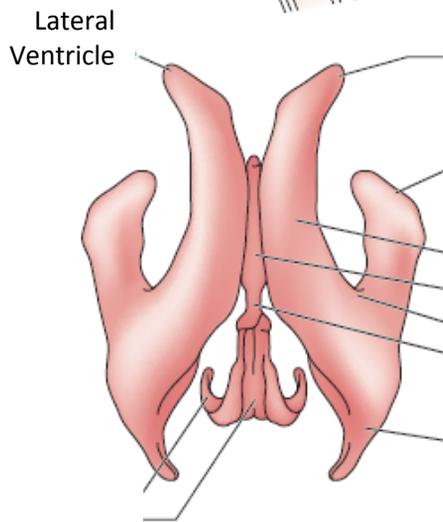
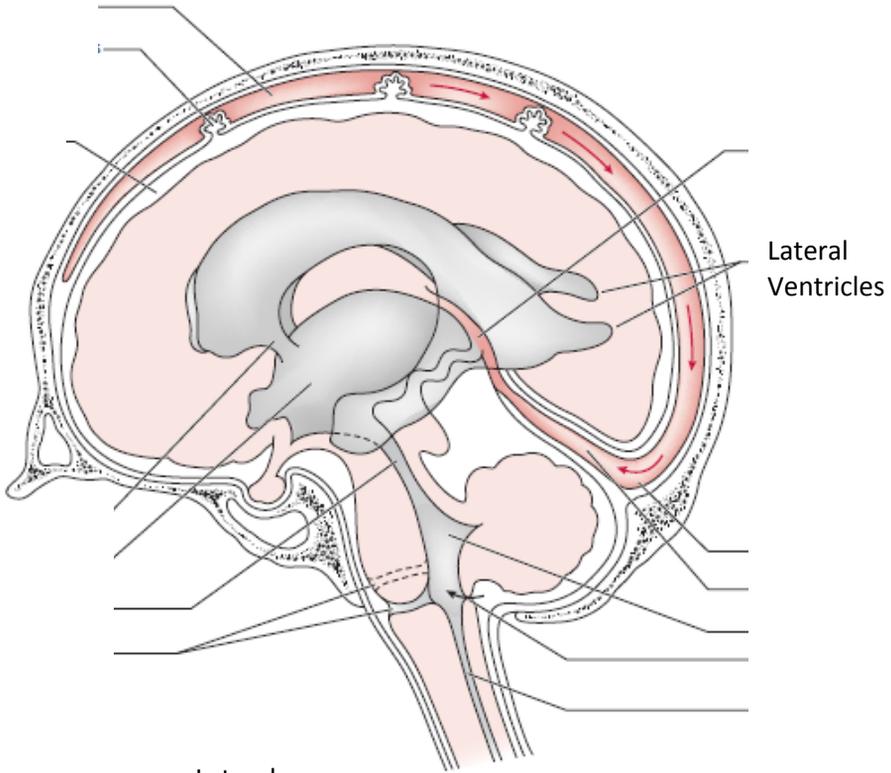


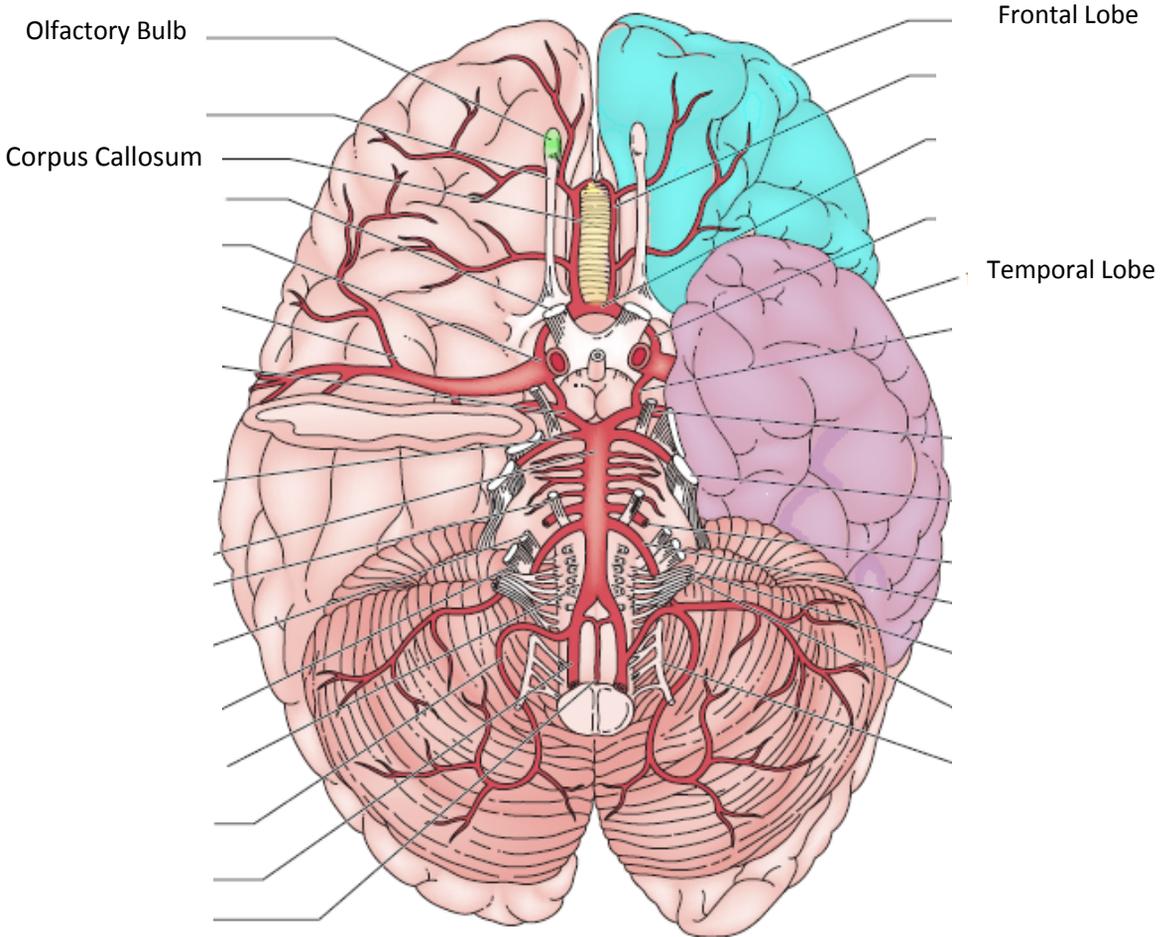
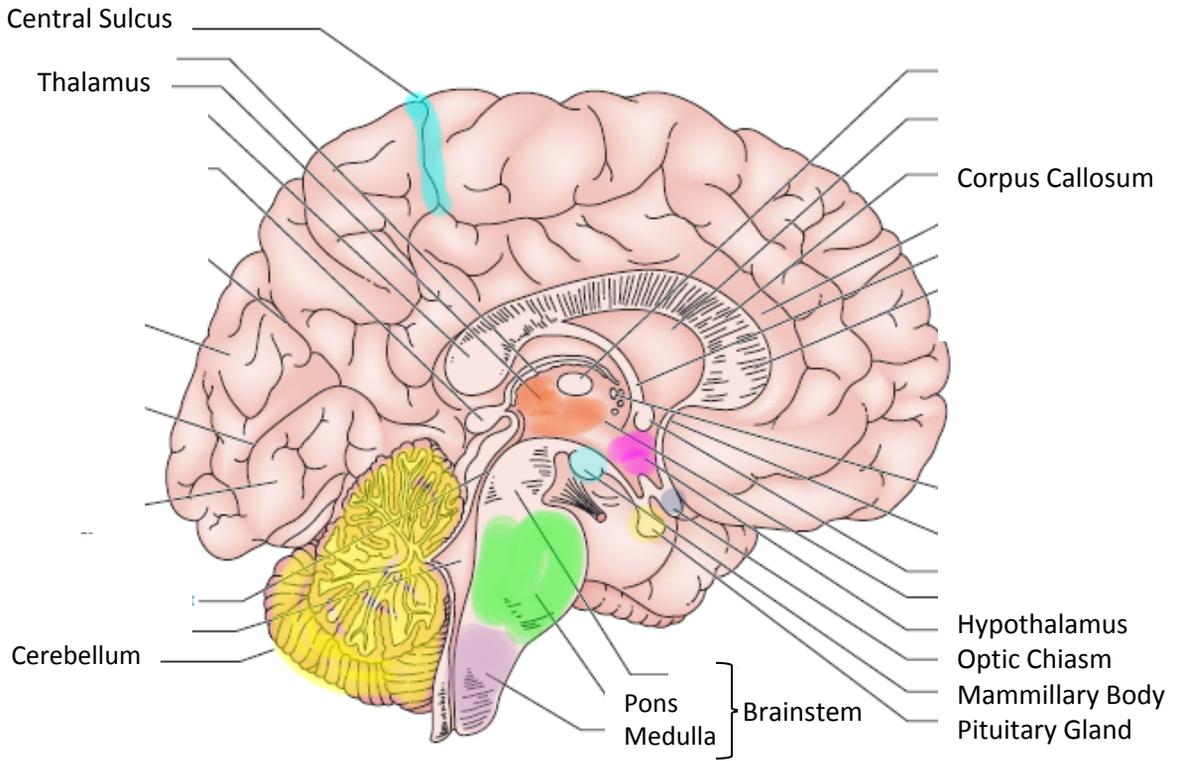
Front

Back



# Fluid-filled spaces in the brain







Longitudinal Cerebral Fissure

Lateral Sulcus

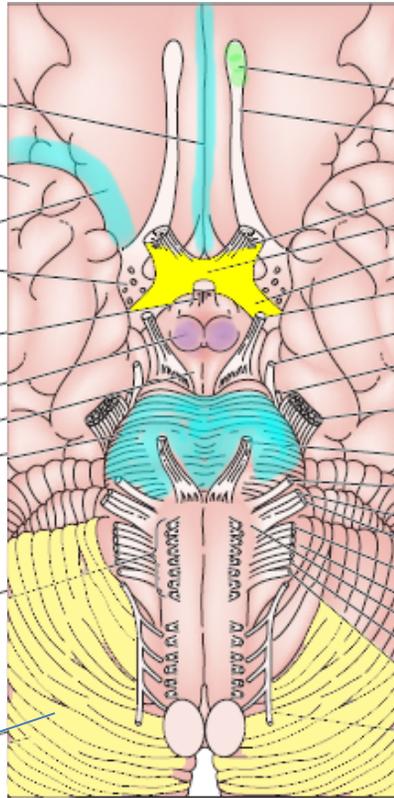
Mammillary Bodies

Pons

Cerebellum

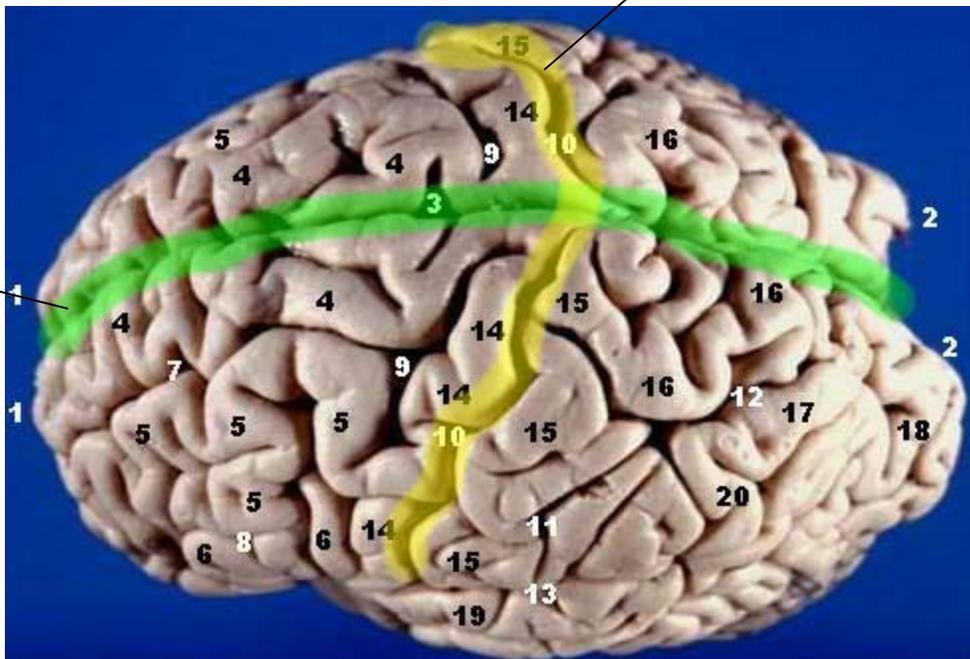
Olfactory Bulb

Olfactory Chiasm

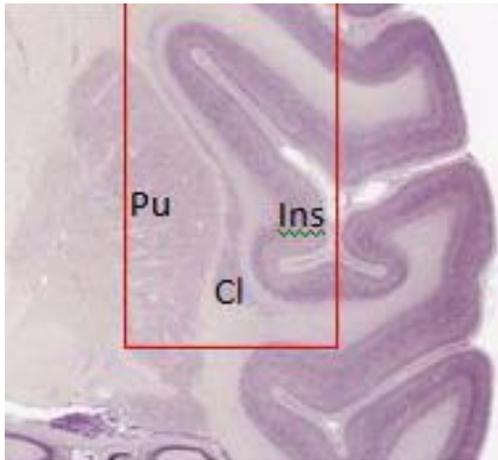


Central Sulcus

Longitudinal Cerebral Fissure



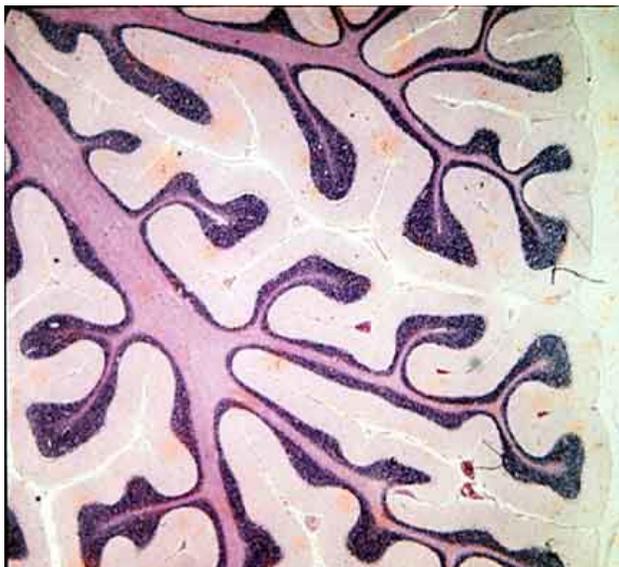
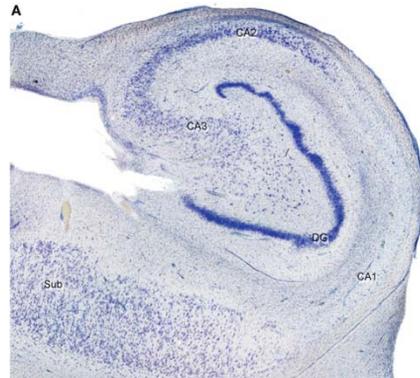
# Neurohistology



## Cortex

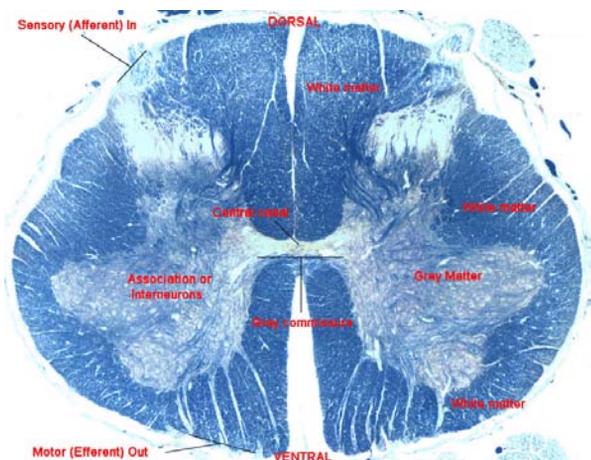
- folded pattern of sulci and gyri
- cells on outer edges
- axon tracts toward inside

## Hippocampus Curved shape



## Cerebellum dense, tree-like extensions

## Spinal Cord Classic “butterfly” shape Right/Left Symmetry



## Patient Diagnosis Section

The Patient Diagnosis Section consists of 15 videos of patients, each with one of the neurological disorders listed below (some may occur twice). The video will portray motor and/or other key symptoms of the disease in question, and a brief medical history, as told by the patient, will be provided in written form.

After watching the video, students may request results for up to two clinical, laboratory, or imaging exams, listed below. The appropriate results for the tests will be provided immediately. The task then is to diagnose to the best of the students' ability the most likely neurological disorder, to be written on the answer sheet provided. After the completion of each video, students will have two minutes to establish a diagnosis.

The tests that can be requested by the student are listed below, as well as information on the various disorders. Please keep in mind that this is not an actual diagnostic manual, but an outline of the most common cases of the disorders. For the Brain Bee, this is the only information you need to be familiar with.

### **Tests allowed to be conducted:**

#### Mental Tests

- 1) Intelligence Test
- 2) Memory Test

#### General Tests

- 3) Blood Test
- 4) DNA Test
- 5) Lumbar Puncture
- 6) Blood Pressure Measurement
- 7) Vital Signs
- 8) Nerve Conduction Test

#### Neurological Evaluation

- 9) Reflex Evaluation
- 10) Motor Evaluation
- 11) Sensory Evaluation

#### Imaging Techniques

- 11) Electroencephalogram
- 12) Electromyogram
- 13) Cerebral Blood Flow Study
- 14) CT Scan
- 15) X-Ray
- 16) functional MRI
- 17) MRI

## **Neurological Disorders:**

- 1) Huntington's Disease
- 2) Parkinson's Disease
- 3) Alzheimer's Disease
  
- 4) Bipolar Disorder
- 5) Schizophrenia
- 6) Autism
  
- 7) Epilepsy
- 8) Stroke
- 9) Multiple Sclerosis
  
- 10) Neurological AIDS
- 11) Chronic Pain
- 12) Addiction
  
- 13) Tourette's Syndrome
- 14) Hydrocephalus
- 15) Cerebral Palsy

## 1) Huntington's disease (HD)

- ⤴ inherited disease, occurs in the family
- ⤴ causes brain atrophy, which occurs when certain nerve cells in the brain die
- ⤴ symptoms most commonly begin around the 30s or 40s
- ⤴ Patients usually live 15-20 years after being diagnosed

### Symptoms:

#### 1) early symptoms

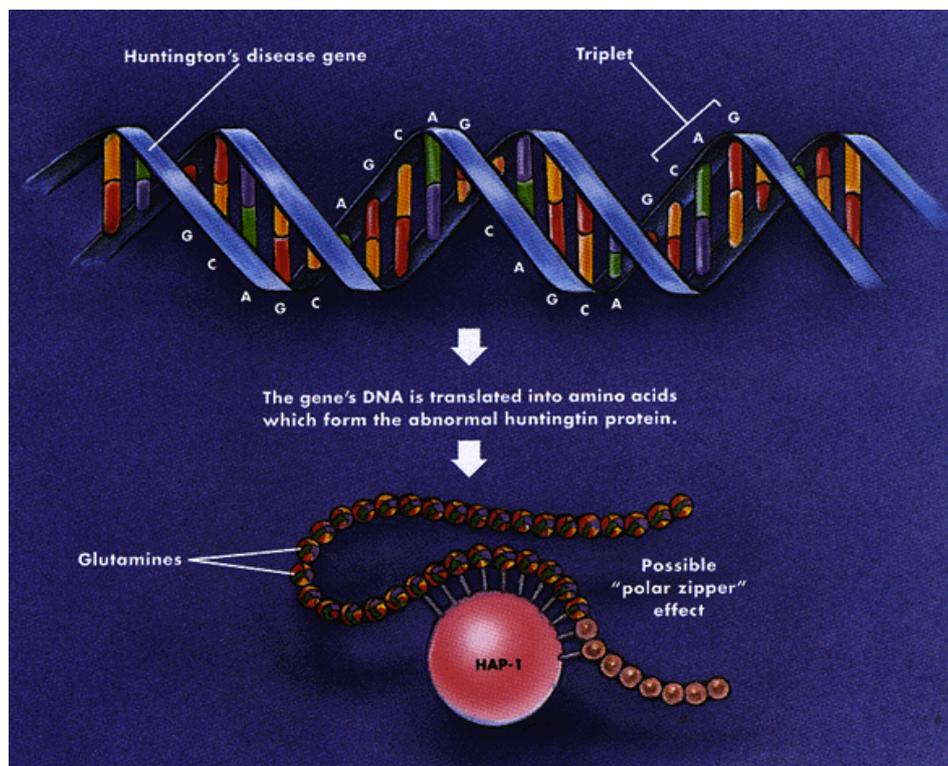
- ⤴ psychosis
- ⤴ uncontrolled movements, such as quick, sudden jerking movements of the limbs and face (known as chorea)
- ⤴ balance problems

#### 2) later symptoms

- ⤴ inability to walk, talk or swallow
- ⤴ more uncontrolled movements, such as face and body spasms
- ⤴ some patients also develop dementia and personality changes, like depression

### Tests:

- ⤴ Blood test and DNA test would indicate that the huntingtin gene is abnormally duplicated, located on Chromosome 4
- ⤴ Reflex Evaluation: abnormal
- ⤴ Memory and Intelligence Tests: can be abnormal in advanced stages
- ⤴ Motor Evaluation: abnormal
- ⤴ CT Scan and MRI Scan: loss of brain tissue, particularly in the caudate nuclei and striatum



*abnormal duplication of the huntingtin gene is assumed to be the fundamental cause of Huntington's disease.*

[http://www.biotechpark.org.in/misf/huntingtons\\_illus\\_large.gif](http://www.biotechpark.org.in/misf/huntingtons_illus_large.gif)

## 2) Parkinson's Disease

- ⤴ idiopathic (unknown cause) degenerative disorder of the CNS
- ⤴ results from the death of dopamine-producing cells in the substantia nigra, a part of the brain mainly important for movement
- ⤴ average age of onset lies between 50 and 60 years

### Symptoms

#### 1) Early Symptoms: mainly motor symptoms

- ⤴ tremor (usually in the hands)
- ⤴ bradykinesia (slowness of movement)
- ⤴ rigidity (stiffness and resistance to limb movement)
- ⤴ postural instability (impaired balance and frequent falls)
- ⤴ or example, Parkinson patients exhibit slowness in getting out of the chair and then the 'parkinsonian gait' characterized by rapid shuffling steps.

#### 2) Later Symptoms: neuropsychiatric symptoms also tend to occur, such as:

- ⤴ depression
- ⤴ dementia
- ⤴ problems in planning actions
- ⤴ memory impairment.
- ⤴ Symptoms worsen as the disease progresses

### Tests

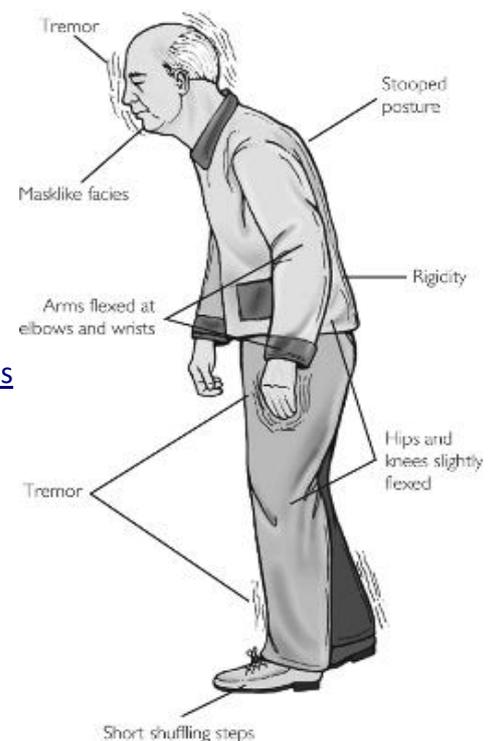
- ⤴ CT Scan and MRI scan: loss of brain tissue, particularly in the substantia nigra, in advanced stages
- ⤴ Memory tests: abnormal in advanced stages
- ⤴ Motor evaluation: abnormal
- ⤴ Reflex evaluation: abnormal
- ⤴ Intelligence test: can be abnormal in advanced stages

### VIPs:

- ⤴ Michael J. Fox

right: patient exhibiting the typical "parkinsonian gait"

<http://bio349.biota.utoronto.ca/20089/20089bio349graham/parkinsons/images/intro.jpg>



### 3) Alzheimer's Disease

- ⤴ mostly sporadic, degenerative disease
- ⤴ the most common cause of dementia in the elderly
- ⤴ AD diagnosis mostly around 65 years of age
- ⤴ The exact cause is unknown, though it is hypothesized that the death of cholinergic neurons in the brain is an important factor. Neuropathological symptoms also include the formation of 'neurofibrillary tangles' and 'amyloid plaques' in affected patients.

#### Symptoms

##### 1) Early Symptoms:

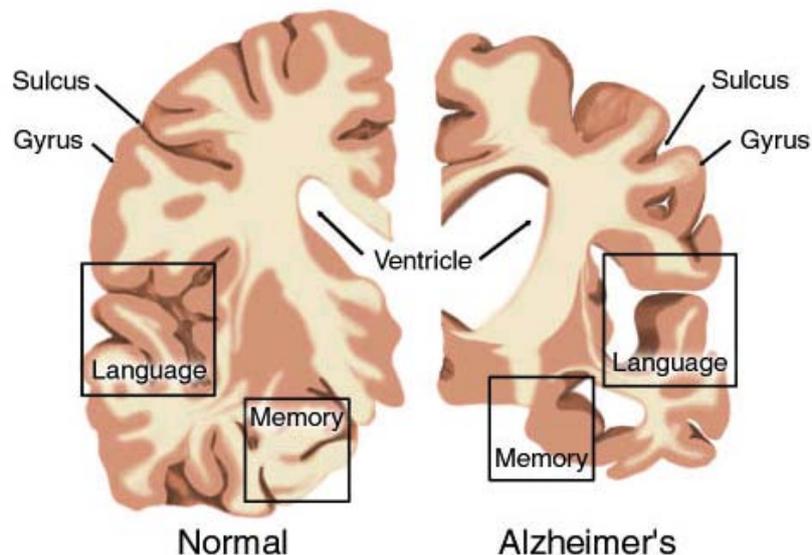
- ⤴ short-term memory impairments
- ⤴ confusion
- ⤴ language difficulties

##### 2) Later Symptoms

- ⤴ language is greatly reduced, eventually leading to complete loss of speech
- ⤴ balance and the execution of complex motor activities also become impaired
- ⤴ The cause of death is typically an external factor, such as an infection or pneumonia. Death usually occurs after 4 years of diagnosis.

#### Tests:

- ⤴ Reflex evaluation: abnormal in advanced stages
- ⤴ Memory test: greatly abnormal
- ⤴ Motor evaluation: abnormal
- ⤴ CT and MRI Scans: loss of brain tissue, especially in cortex
- ⤴ Intelligence test: abnormal in advanced stages



*image showing the structural changes of a brain of an Alzheimer patient (right) compared to a normal patient*

[http://www.ahaf.org/assets/images/brain\\_cross\\_section\\_border.jpg](http://www.ahaf.org/assets/images/brain_cross_section_border.jpg)

#### 4) Bipolar Disorders:

- ⤴ Evidence suggests that it occurs more often in relatives of people with bipolar disorders, but genetic studies remain inconsistent and not replicated.
- ⤴ Include manic depression and bipolar affective disorders and are characterized by a condition in which people quickly go back and forth between periods of very good or irritable mood and depression.
- ⤴ Symptoms usually start between ages 15 – 25.

##### Symptoms:

- ⤴ Three main subtypes have been described:

1) Type I: patients have had at least one manic episode and periods of major depression.

2) Type II: patients never had full mania but hypomania combined to episodes of depression.

3) Cyclothymia: less severe form; patients have hypomania and mild depression.

##### A manic phase involves:

- ⤴ distraction
- ⤴ little need for sleep
- ⤴ poor judgment, poor temper control
- ⤴ lack of self control, hyperactivity
- ⤴ very high self-esteem, psychosis.

##### A depressive phase involves:

- ⤴ sadness, loss of appetite and weight
- ⤴ fatigue, hopelessness,
- ⤴ loss of self-esteem, thoughts of death and suicide

##### Suggested environmental factors triggering manic episodes are:

- ⤴ drastic life changes
- ⤴ medication with antidepressants and steroids
- ⤴ sleeplessness
- ⤴ drug use.
- ⤴ If suicide not successful, patients usually have a normal life length, but their lives are severely impaired.

##### Tests:

- ⤴ There is no simple test for the diagnosis of bipolar disorders: diagnosis is based on self reported experiences or abnormalities reported by family, friends, co-workers.

##### However:

- ⤴ Blood tests: might be used to reveal / exclude thyroid problems or to measure drug levels.
- ⤴ MRI tests: increased volume of the lateral ventricles and globus pallidus and increased rates of deep white matter hyperintensities.
- ⤴ CT scan: might be used to exclude brain lesions.
- ⤴ EEG: might be used to exclude epilepsy.
- ⤴ Memory and Intelligence test: lack of attention, memory impairment.

##### V.I.Ps:

- Vincent van Gogh (still in debate)

*"Bipolar disorder, also known as manic-depressive illness, is a brain disorder that causes unusual shifts in mood,*



*energy, activity levels, and the ability to carry out day-to-day tasks. Symptoms of bipolar disorder are severe. They are different from the normal ups and downs that everyone goes through from time to time. Bipolar disorder symptoms can result in damaged relationships, poor job or school performance, and even suicide. But bipolar disorder can be treated, and people with this illness can lead full and productive lives."*

**Source:** <http://www.nimh.nih.gov/health/publications/bipolar-disorder/complete-index.shtml>

## 5) Schizophrenia

- ✦ Genetic and epigenetic factors not yet fully understood; presence of mutations in risk genes is not necessarily leading to schizophrenia.
- ✦ Genetic predisposition in combination to environmental and social stress as well as cannabis or THC consume is providing the basis for the outbreak of the disorder.
- ✦ The disorder might be due to both neurodevelopmental impairment and neurodegeneration.
- ✦ Clinical picture differs between patients and includes a cluster of symptoms involving cognitive and motor abnormalities. Diagnosis not trivial.
- ✦ Most commonly, symptoms appear during puberty (12-15 years).
- ✦ Patients usually have a normal life length, but their lives are severely impaired.

### Symptoms:

- ✦ can be divided into prodromal phase, negative symptoms and positive symptoms

#### 1) Prodromal phase and negative symptoms:

- ✦ lack of social behavior / isolation
- ✦ lack of personal hygiene
- ✦ lack of emotions and motivation
- ✦ breakdown of performance at school and / or work.

#### 2) Positive symptoms (characteristic for each subtype of the disorder)

- ✦ disorganized speech
- ✦ disorganized behavior
- ✦ catatonia
- ✦ psychotic episodes including delusions hallucinations – mostly auditory but also visual, aggressive outbreaks.

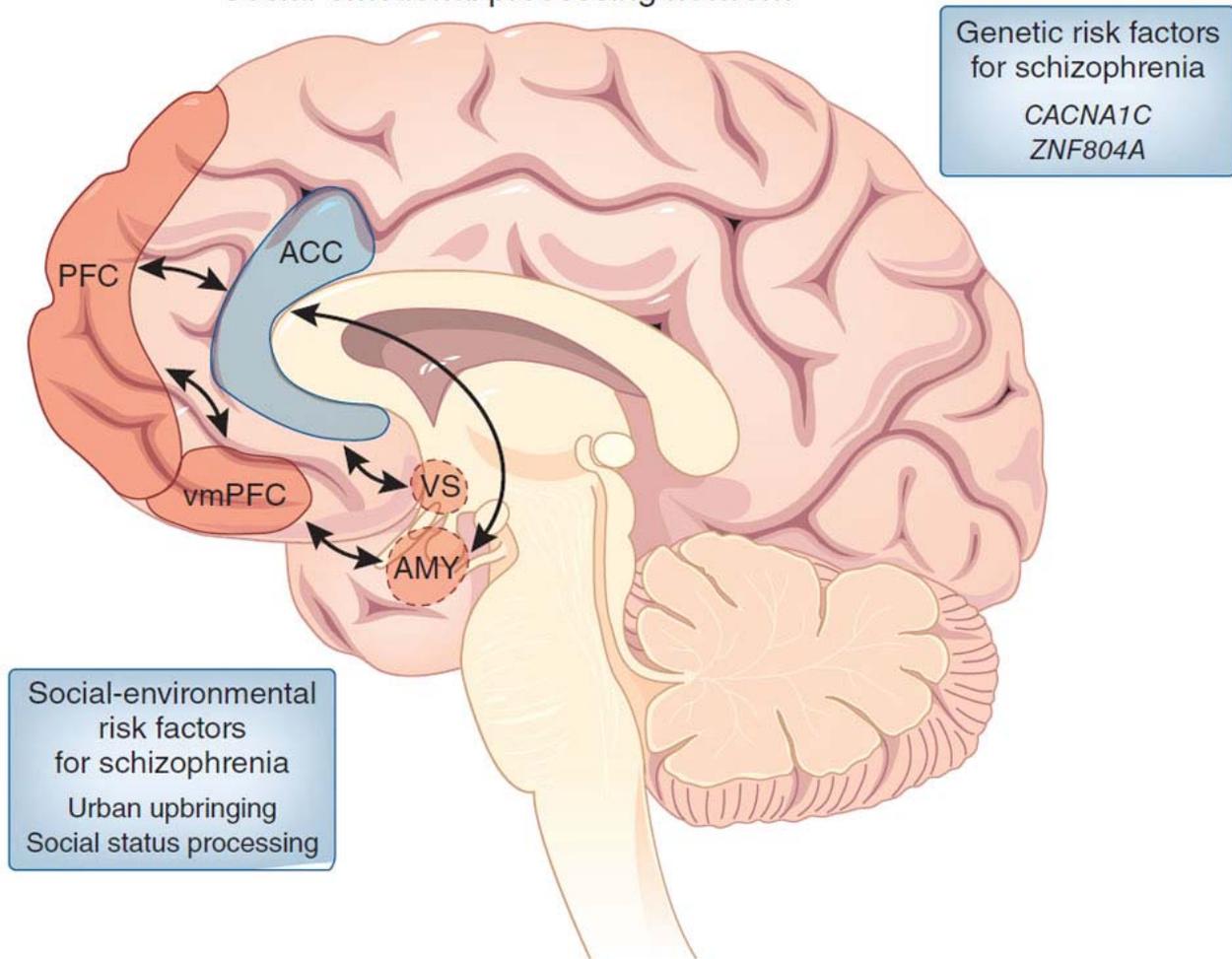
### Tests:

- ✦ Blood and DNA test: some of the risk genes are mutated, copy number variations (CNVs).
- ✦ CT and MRI scan / neuroimaging: enlarged ventricles, dysfunction of PFC and the limbic system, abnormal neurotransmitter levels - particularly dopamine.
- ✦ EEG: abnormal synchronization of brain waves.
- ✦ Motor evaluation: can be abnormal in catatonic patients during a psychotic episode.
- ✦ Memory and Intelligence tests: more or less severe cognitive impairment as well as disorganized thoughts and speech.

### VIPs with schizophrenia and movies:

- ✦ John Nash, whose biography is summarized in the movie “A beautiful mind”, with Russel Crowe (2001).

## Social-emotional processing network



*Effects of social environmental risk factors for schizophrenia on regulatory circuits of human social-emotional processing. In this circuitry, the anterior cingulate cortex (ACC) is a key node that is influenced by higher-order cognitive processing areas such as the prefrontal cortex (PFC), and it provides top-down control of subcortical neural areas modulating stress response, salience and negative emotion, such as the amygdala (AMY) and the ventral striatum (VS). Effects of urban upbringing and social status processing can challenge ACC function and limbic structures such as ventral striatum and amygdala. Similarly, established genetic risk variants for schizophrenia can affect ACC-amygdala coupling (for example, ZNF804A) and activation (for example, CACNA1C). This highlights a neural circuit where social environmental and genetic risk factors for schizophrenia converge. vmPFC, ventral medial prefrontal cortex.*

Source: [Puzzling over schizophrenia: Schizophrenia, social environment and the brain. Heike Tost & Andreas Meyer-Lindenberg](#); Nature Medicine 18, 211-213 (2012)

## 6) Autism and ASD (Autism Spectrum Disorder)

- ⤴ Strong genetic basis explained by rare mutations, copy number variations or combination of genetic variants; genetics of autism not well understood, though.
- ⤴ Associated with agents causing birth defects and / or environmental stress (still in debate).
- ⤴ Neurodevelopmental disorder characterized by impaired information processing in the brain and by abnormally organized synaptic connections and neural circuitries. Not restricted to specific region/s: widespread dysfunction throughout the whole brain.
- ⤴ No clear unifying mechanism at either the molecular, cellular and systems levels.
- ⤴ Strong evidence suggests that autism arises very early in prenatal and postnatal development.
- ⤴ Patients usually have a normal life length, but their lives are severely impaired.

### Symptoms

#### 1) Abnormalities of social interactions:

- ⤴ lack of intuition
- ⤴ less attention to social stimuli
- ⤴ lack of response to one's own name
- ⤴ less eye contact
- ⤴ less likely to approach others etc.

#### 2) Abnormalities of communication

- ⤴ echolalia
- ⤴ reverse pronouns
- ⤴ impaired joint attention
- ⤴ difficulty to express needs
- ⤴ abnormal gesture

#### 3) severely restricted interests and highly repetitive behavior:

- ⤴ stereotyped, compulsive behavior
- ⤴ ritualistic behavior
- ⤴ self injury

### Tests

- ⤴ Blood and DNA tests: copy number variations (CNVs). However, for most of the candidate genes, the actual mutations that increase the risk for autism have not been identified.
- ⤴ Functional neuroimaging: local overconnectivity in the cortex, impaired function of the association cortex, delayed processing of auditory signals.
- ⤴ Motor tests: poor muscle tone, poor motor planning, toe walking
- ⤴ Memory and Intelligence tests: impaired language comprehension and inference; lack of attention, under-responsivity to stimuli (walking into things), unusual abilities in memory tasks leading to extraordinary talents.

### VIPs with autism or another ASD and movies:

- ← "Rainman", with Dustin Hoffman and Tom Cruise (1988).
- ← "Snow Cake", with Alan Rickman and Sigourney Weaver (2006).
- ← "Adam" with, Hugh Dancy, Rose Byrne and Peter Gallagher (2009).



*"Intelligence is distinguished by ability to use abstract symbols for functional communication in attaching meaning to one's experiences and in solving problems. Most people with autism display such skills, some to extraordinary degrees. Visual memory for configurations is not central to intelligence, though it is indeed a unique skill, very beneficial in the visual arts, as shown here with Stephen Wiltshire, and mathematics and computer science."*

## 7) Epilepsy

- ⤴ a disorder in which a person has repeated seizures (convulsions) over time
- ⤴ occurs when changes in brain tissues cause the neurons to be over-excitabile (abnormal brain activity)
- ⤴ may be due to another underlying disorder or an unknown cause (idiopathic)
- ⤴ onset of the first episode occurs most frequently in young children or the elderly
- ⤴ common causes include stroke, traumatic brain injury, infections affecting the CNS (meningitis, brain abscess, encephalitis and AIDS) and other disorders/ injuries that alter the brain structure

### Symptoms

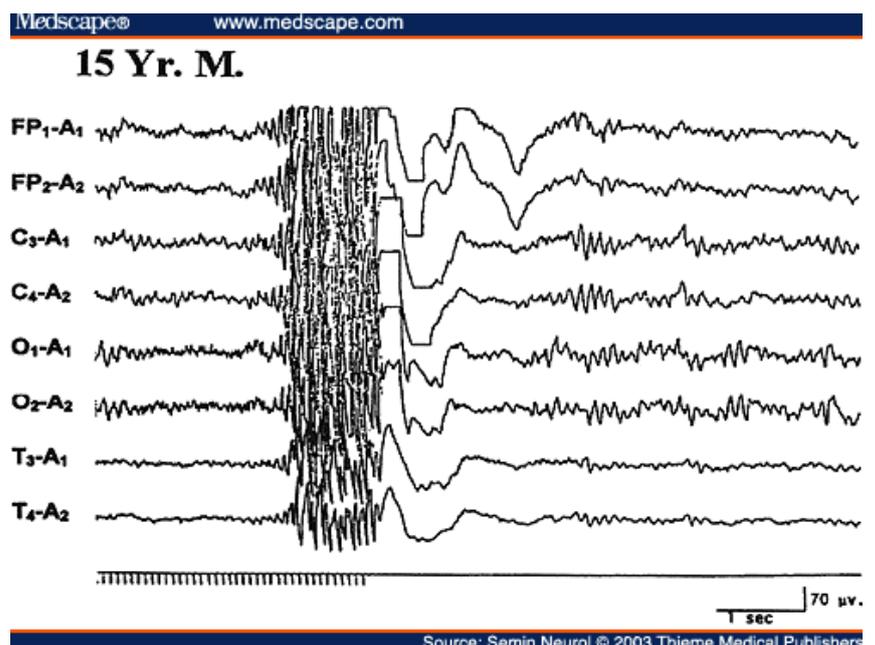
- ⤴ depend on the part of the brain that is affected; some examples are involuntary movements, violent shaking or loss of alertness
- ⤴ some seizures are preceded by an aura; An aura is a strange sensation which often manifests as the perception of a strange light, an unpleasant smell or confusing thoughts or experiences.
- ⤴ Epilepsy is a lifelong condition; certain types of childhood epilepsy go away with age

### Tests:

- ⤴ Neurological history enables a doctor to get a picture of any past seizure activity.
- ⤴ Physical examination can show problems indicating that a part of the brain isn't working properly and therefore may be generating seizures.
- ⤴ EEG (electroencephalogram) reveals abnormal brain electrically activity (EEG is the most important diagnostic tool for epilepsy)
- ⤴ Head CT or MRI scan may show changes in the brain structure that cause the seizures.

An EEG of a 15-year-old patient with primary generalized epilepsy

<http://img.medscape.com/fullsize/migrated/458/594/sin458594.fig2>



## 8) Stroke

- ⤴ occurs when a blood vessel in the brain is blocked (ischemia), leaks (hemorrhage), or bursts
- ⤴ without treatment cells in the brain begin to die
- ⤴ can lead to serious disability or death
- ⤴ 95% of strokes occur in people age 45 and older
- ⤴ is not considered a hereditary disease

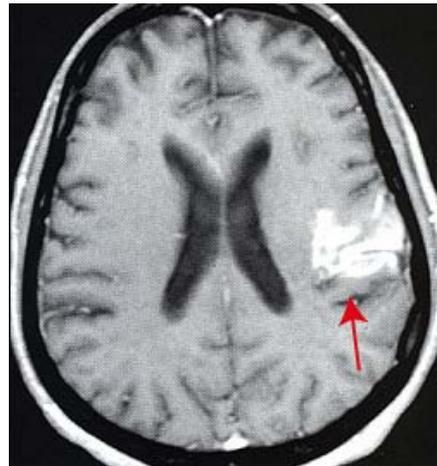
### Symptoms

- ⤴ numbness or weakness of the face, arms or legs, especially on one side of the body
- ⤴ trouble speaking or understanding
- ⤴ difficulties in walking, dizziness, loss of balance or coordination
- ⤴ vision problems in one or both eyes

### Tests

- ⤴ Blood test would indicate increased levels of a certain protein molecule (Fetuin-A)
- ⤴ DNA test would indicate no abnormality
- ⤴ Reflect evaluation: abnormal
- ⤴ Memory and Intelligence Tests: can be abnormal
- ⤴ CT and MRI Scan: clogged blood vessel and loss of brain tissue on one side

*MRI of a patient who has had a stroke of the left hemisphere of the brain.*



<http://www.theuniversityhospital.com/stroke/images/diagnosis/mri.jpg>

## 9) Multiple sclerosis (MS)

- ✦ Autoimmune disease of the central nervous system (CNS), which progressively injures the nerves of the brain and spinal cord.
- ✦ can occur at multiple places and the inflammation leads to the development of scars (sclerosis)
- ✦ oligodendrocytes get destroyed which leads to demyelination (myelin sheaths around the axons of the CNS get damaged)
- ✦ Most common subtype is the relapsing-remitting MS (65%-80% of affected patients)
- ✦ diagnosis between the age of 20 and 40
- ✦ Life expectancy of people with MS is 5 to 10 years lower than that of the unaffected population.
- ✦ The exact cause of MS is unknown. It is not considered a hereditary disease.

### Symptoms

#### 1) General

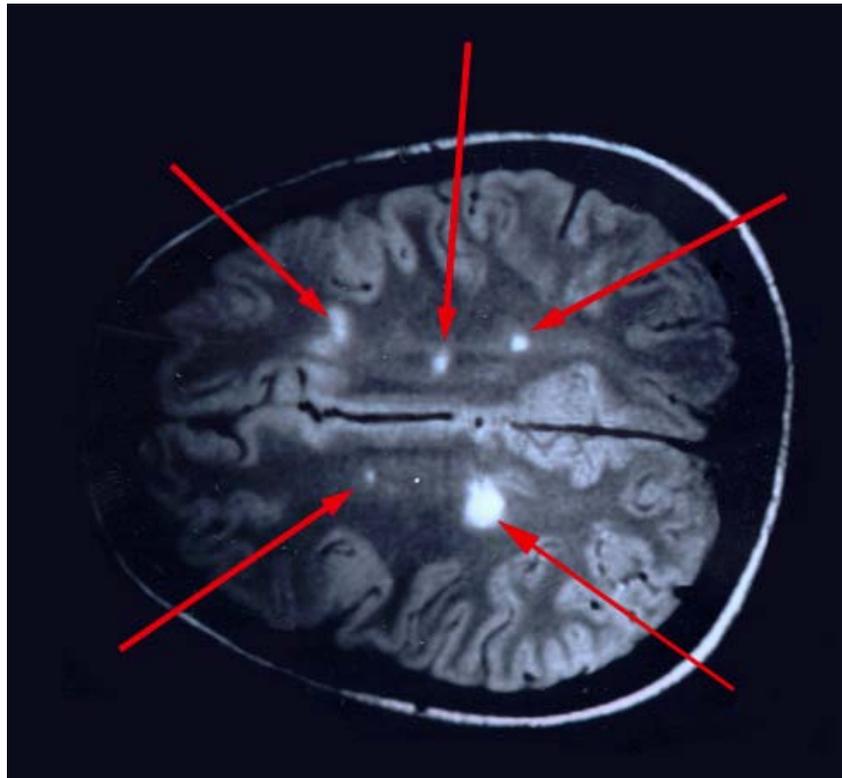
- ✦ unpredictable acute attacks
- ✦ worsening of symptoms followed by full, partial, or no recovery of some function, intermingled by periods of months to years of relative quiet (remission) with no new signs of disease activity.

#### 2) Specific

- ✦ changes in sensation (loss of sensitivity, prickling pain, numbness)
- ✦ muscle weakness
- ✦ muscle spasms, loss of coordination and balance
- ✦ visual problems
- ✦ speech impediment
- ✦ tremors, or dizziness
- ✦ bladder and bowel dysfunction
- ✦ depression, unstable mood

### Tests:

- ✦ Blood test and DNA test would indicate no abnormality
- ✦ Reflex Evaluation: abnormal
- ✦ Memory and Intelligence Tests: slight memory problems, intelligence is not affected
- ✦ CT Scan and MRI Scan: brain and spinal cord show multiple areas of demyelination (lesions or plaques)



*Multiple areas of demyelination are present in cerebral hemispheres in this patient with multiple sclerosis.*

[http://www.google.de/imgres?q=ms+demyelination&num=10&um=1&hl=de&biw=1280&bih=553&tbn=isch&tbnid=ya0PuLpyiM31qM:&imgrefurl=http://library.med.utah.edu/kw/ms/mml/ms\\_hemisphere2.html&docid=6jsKs2QLnRQYIM&imgurl=http://library.med.utah.edu/kw/ms/mml/ms\\_hemisphere2.jpg&w=500&h=477&ei=nkSNT\\_DkHYjusgb14JnjCQ&zoom=1&iact=hc&vpx=684&vpy=131&dur=500&hovh=218&hovw=230&tx=103&ty=104&sig=106712738942380889934&sqi=2&page=1&tbnh=106&tbnw=142&start=0&ndsp=23&ved=1t:429,r:4,s:0,i:72](http://www.google.de/imgres?q=ms+demyelination&num=10&um=1&hl=de&biw=1280&bih=553&tbn=isch&tbnid=ya0PuLpyiM31qM:&imgrefurl=http://library.med.utah.edu/kw/ms/mml/ms_hemisphere2.html&docid=6jsKs2QLnRQYIM&imgurl=http://library.med.utah.edu/kw/ms/mml/ms_hemisphere2.jpg&w=500&h=477&ei=nkSNT_DkHYjusgb14JnjCQ&zoom=1&iact=hc&vpx=684&vpy=131&dur=500&hovh=218&hovw=230&tx=103&ty=104&sig=106712738942380889934&sqi=2&page=1&tbnh=106&tbnw=142&start=0&ndsp=23&ved=1t:429,r:4,s:0,i:72)

## 10) Neurological AIDS: HIV Associated Dementia (HAD)

- ✦ HIV dementia (HAD) appears in the later stages of AIDS and normally associated with increase viral load and a decrease in CD4 cells to 200 cells/microliter.
- ✦ Typically occurs in older patients and females have a greater risk of developing HAD
- ✦ Through to be caused by an prolonged AIDS induced inflammatory response that damages nerve cells
- ✦ Patients taking antiviral drugs have a slower, prolong, and possibly milder form of HAD.

### Symptoms:

- ✦ HAD symptoms fall into three categories:

#### 1) Cognitive:

- ✦ problems in concentration
- ✦ memory loss
- ✦ generalized slowdown in mental functions

#### 2) Motor:

- ✦ poor coordination
- ✦ weakness in legs
- ✦ difficulty with maintaining balance
- ✦ tendency to drop things
- ✦ decline in clarity of handwriting
- ✦ loss of bladder or bowel control

#### 3) Behavioral

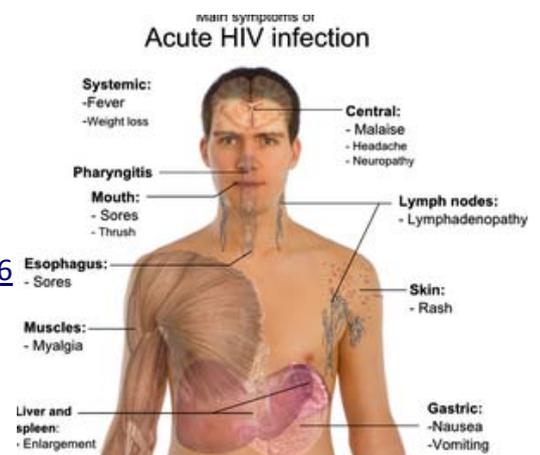
- ✦ changes in personality
- ✦ impaired judgment

### Tests:

- ✦ Blood Test: HIV positive
- ✦ CT/MRI: viral encephalitis and cortical atrophy
- ✦ EEG. Reduced electrical activity
- ✦ Lumbar Puncture: no detectable HI Virus

right: HIV gives rise to a number of symptoms other than neurological AIDS.

[http://4.bp.blogspot.com/\\_kDJ8KLuH3o/TjCp61PdeI/AAAAAAAAAFHQ/Khg7Z75JfS8/s1600/300px-Symptoms\\_of\\_acute\\_HIV\\_infection.png](http://4.bp.blogspot.com/_kDJ8KLuH3o/TjCp61PdeI/AAAAAAAAAFHQ/Khg7Z75JfS8/s1600/300px-Symptoms_of_acute_HIV_infection.png)



## 11) Chronic Pain: Diabetic Neuropathy

- ⤴ Long term complication of Type 1 and Type II Diabetics, usually takes years to develop
- ⤴ typically occurs in older adults (50-60s)
- ⤴ results from nerve damage caused by the prolonged effects of high glucose levels
- ⤴ Risk factors include: low to no regulation of blood glucose levels, lack of exercise, poor diet.
- ⤴ Tylenol, NSAIDs, tricyclic antidepressants (TCAs), and antiepileptic drugs (AEDs) are all used to treat diabetic neuropathy (see symptoms)

### Symptoms:

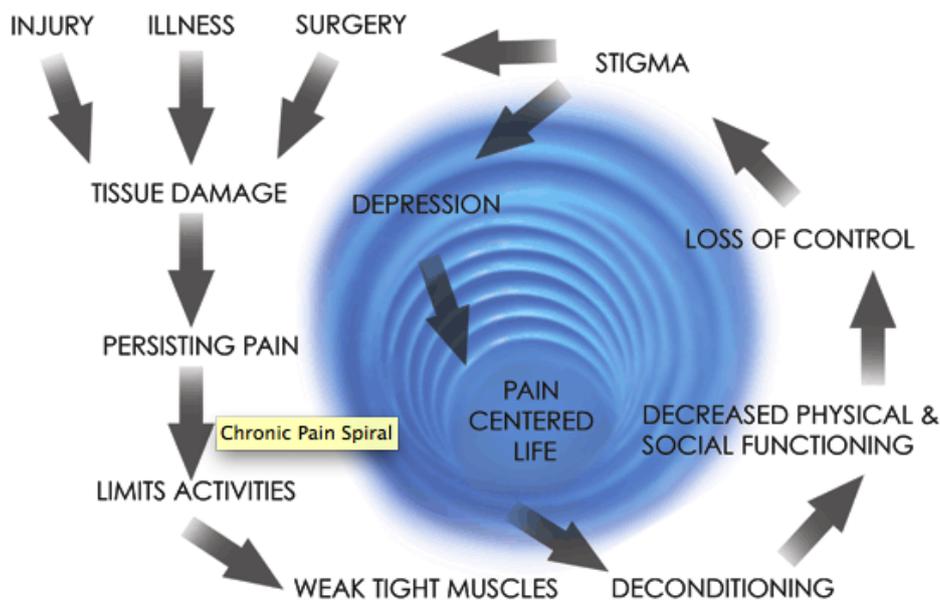
- ⤴ chronic pain
- ⤴ numbness
- ⤴ touch sensitivity
- ⤴ muscle wasting/weakness
- ⤴ sores and ulcers

### can result in:

- ⤴ autonomic neuropathy (damage to nerves controlling bladder, digestive, and reproductive functions)
- ⤴ or peripheral neuropathy (damage to nerves of the extremities, especially feet and legs).

### Tests:

- ⤴ Blood test: diagnosis of diabetes mellitus
- ⤴ EMG: normal in mild or neurologically asymptomatic patients, but demonstrates denervation in more severe diabetic neuropathies
- ⤴ Nerve Conduction Test: reduced sensory nerve conduction velocity and decreased amplitude
- ⤴ Gastric MRI: may demonstrate delayed gastric emptying



*The Chronic Pain Spiral*  
[http://www.rothbart.com/images/img\\_chronic\\_pain\\_spiral.gif](http://www.rothbart.com/images/img_chronic_pain_spiral.gif)

## 12) Addiction

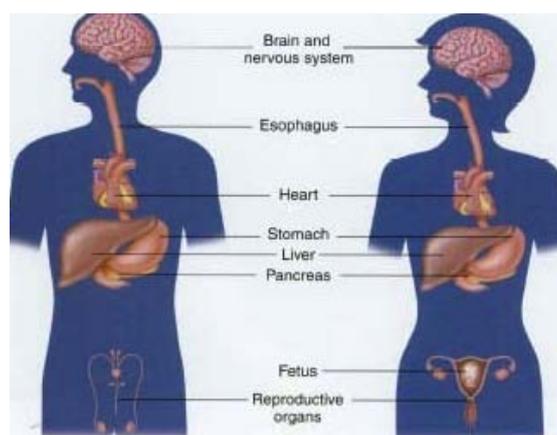
- ✦ chronic disease defined as a physical and psychological dependence on certain psychoactive substances
- ✦ Alcohol addiction, or alcoholism, is a compulsive and uncontrolled consumption of alcoholic beverages that is usually detrimental to the patient in question.
- ✦ Alcohol addiction is said to arise most commonly in 15-24 year-olds. Risk factors for developing an alcohol addiction include the social environment, stress, mental health and family history.

### Symptoms

- ✦ developed tolerance towards alcohol
- ✦ compulsive alcohol craving and seeking
- ✦ alcohol withdrawal syndrome that occurs in absence of the drug
- ✦ difficulties in controlling the addictive behavior
- ✦ persistence in usage despite alcohol's detrimental effects
- ✦ denial of being dependent on the drug.
- ✦ An onset of depression and/or anxiety is a further common symptom as well as social problems, such as aggression or isolation.
- ✦
- ✦ Long-term alcohol abuse generally results in liver problems as well as structural and functional changes in brain areas related to the reward pathway.
- ✦ Alcohol addiction also increases the risk of developing heart disease, cancer and neurological conditions such as alcoholic dementia or alcohol neuropathy.

### Tests:

- ✦ Blood test: abnormally high levels of ethanol
- ✦ MRI and CT Scan: may show loss of brain tissue in advanced stages
- ✦ Blood Pressure Measurement: abnormally high



*Alcoholism affects many different parts of the body.*

[http://www.humanillnesses.com/original/images/hdc\\_0001\\_0001\\_0\\_img0015.jpg](http://www.humanillnesses.com/original/images/hdc_0001_0001_0_img0015.jpg)

## 13) Tourette's Syndrome

- ✦ Tourette syndrome (TS) is a neurological disorder characterized by repetitive, stereotyped, involuntary movements and vocalizations called tics
- ✦ Normally diagnosed during early childhood, patients experience peak tic severity before the mid-teen years with improvement for the majority of patients in the late teen years and early adulthood.
- ✦ TS is usually associated with ADHD, OCD, Bipolar disorder, Depression, and anxiety disorders

### Symptoms

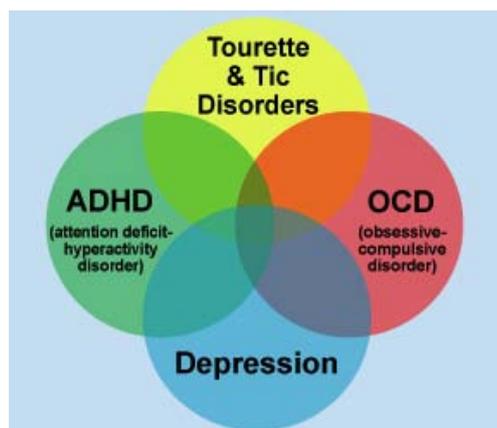
- ✦ Tics can be simple (sudden/brief movements involving one motor group such as eye blinking or head jerking)
- ✦ or complex (repetitive patterns of movements or vocalization of phrases)

### Vocalizations tics in server cases of (TS):

- ✦ can be coprolalia (uttering socially inappropriate words such as swearing)
- ✦ or echolalia (repeating the words or phrases of others).

### Tests

- ✦ Brain MRI: normal
- ✦ EEG: normal
- ✦ Blood Test: no abnormalities
- ✦ CT: normal



*Tourette's is usually associated with depression, ADHD or OCD.*

<http://www.greatplainslaboratory.com/home/eng/tourette/tourette-graphic.jpg>

## 14) Hydrocephalus

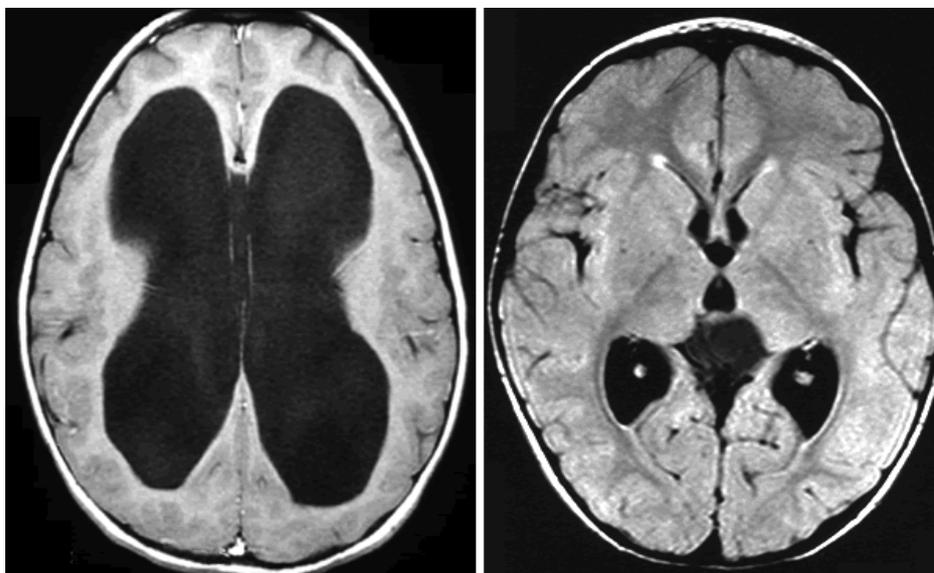
- ⤴ The brain and the spinal cord are surrounded by a fluid called cerebrospinal fluid (CSF) that provides cushion for the brain and the spinal cord.
- ⤴ Abnormal flow of the fluid leads to an accumulation of CSF in the ventricles (cavities of the brain, in which the CSF flows) due to one of the following causes:
  - an obstruction (e.g. a brain tumor) that blocks the flow
  - failure of the brain to reabsorb the CSF into the blood
  - overproduction of the CSF
- ⤴ The Buildup of fluid results in an increase in the intracranial pressure (pressure inside the skull) which causes damage to the brain.
- ⤴ It can be congenital or as a result of brain injury
- ⤴ Without treatment, up to 6 in 10 people with hydrocephalus will die. Those who survive have different amounts of intellectual, physical, and neurological disabilities.

### Possible Symptoms:

- ⤴ vomiting
- ⤴ seizures
- ⤴ irritability
- ⤴ excessive sleepiness
- ⤴ headache
- ⤴ abnormal eye movements
- ⤴ loss of coordination
- ⤴ changes in personality and/or memory, ect.
- ⤴ In infants, as hydrocephalus causes a bulge of the fontanelles (soft spots of the skull) and the head to be larger than usual, a physical examination may provide very useful clues.
- ⤴ Head circumference measurements, repeated over time, may show that the head is getting bigger.

**Tests:** head CT scan: one of the best tests for identifying hydrocephalus.

*MRI scans featuring a patient suffering from hydrocephalus (left) and a normal brain (right)*



[http://www.seattlechildrens.org/uploadedimages/SeattleChildrens/cmsassets/Images/hydrocephalus-normal-non-normal-ct-scans\\_large.gif](http://www.seattlechildrens.org/uploadedimages/SeattleChildrens/cmsassets/Images/hydrocephalus-normal-non-normal-ct-scans_large.gif)

## 15) Cerebral Palsy

- ⤴ is a group of non-progressive disorders affecting the voluntary movements of the body
- ⤴ it does not produce ongoing degeneration of the brain (non-progressive)
- ⤴ is caused by damage to the motor control centers of the developing brain and can occur during pregnancy, during childbirth or after birth up to about age three
- ⤴ There is no cure for cerebral palsy. The goal of treatment is to help the person be as independent as possible.

### Symptoms

- ⤴ the disorder is divided into four major classifications: spastic, ataxic, athetoid/dyskinetic and mixed
- ⤴ Symptoms and severity of the symptoms vary from patient to patient
- ⤴ All types of cerebral palsy are characterized by abnormal muscle tone, reflexes, or motor development and coordination.

### Classical symptoms

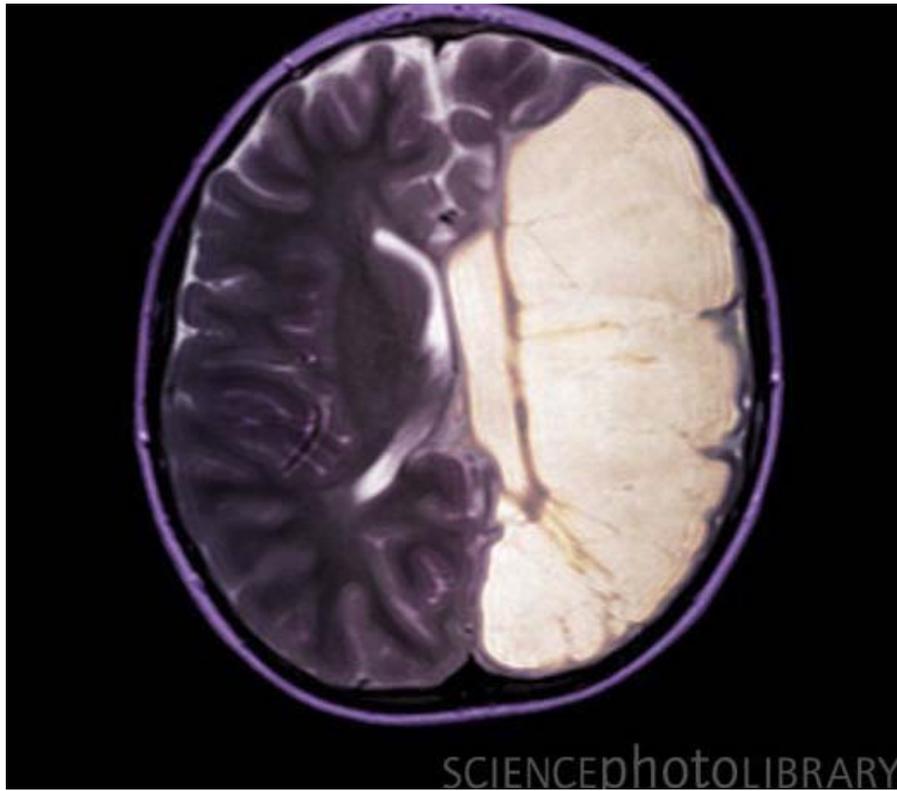
- ⤴ spasms
- ⤴ involuntary movements (for example, Facial gestures)
- ⤴ unsteady gait
- ⤴ balance problems
- ⤴ scissor walking (the knees come inwards and cross)
- ⤴ toe walking

### Other symptoms:

- ⤴ decreased intelligence (although intelligence can be normal)
- ⤴ learning disabilities
- ⤴ Patients can also present with a wider variety of further problems affecting the speech, hearing, vision, eating, digestion and bladder control.

### Tests:

- ⤴ Cerebral palsy is chiefly a clinical diagnose. A full neurological examination is required.
- ⤴ Medical history is very important as it allows physicians to examine a child's development and identify possible causes of CP.
- ⤴ Slow development, abnormal muscle tone and unusual posture are suggestive for CP.
- ⤴ MRI or CT may be ordered to identify lesions or underdeveloped areas of the brain.



*Colored magnetic resonance imaging (MRI) scan of an axial (horizontal) section through the head of a 5 year old boy with cerebral palsy.*

[http://www.sciencephoto.com/image/253106/530wm/M1301012-Cerebral\\_palsy,\\_MRI\\_scan-SPL.jpg](http://www.sciencephoto.com/image/253106/530wm/M1301012-Cerebral_palsy,_MRI_scan-SPL.jpg)

Brain Bee Review Session- Summary  
January 24<sup>th</sup>, 2009, The Neurosciences Institute

Answer format:

- One-word or short phrase answers

Chapters briefly covered at the review session:

- The Neuron
  - o What is an action potential?
  - o Parts of the neuron, plus the myelin sheath
  - o How do neurons communicate?
  - o Make sure you know your neurotransmitters and what each is associated with (for examples: acetylcholine-releasing neurons act on voluntary muscles and regulate one's heartbeat; Parkinson's disease is a result of insufficient amounts of dopamine)
  - o Parts of the brain and functions (occipital lobe: visual processing)
- Brain Development
  - o Neurons and glia- how they interact during development (neuronal migration, for example through layers or zones)
  - o Central Nervous System (brain and spinal cord) vs Peripheral Nervous System (everything else!)
    - PNS divided into: Somatic (voluntary movement and touch) and Autonomic Nervous System (organ function)
      - Autonomic NS divided into: Sympathetic (fight-or-flight mode) and Parasympathetic (relaxed mode) Nervous System
  - o Spinal Cord regions (Cervical, Thoracic, Lumbar, Sacral, and what each region is responsible for)
  - o "Use it or lose it!"- paring back to efficiently use neural resources (for example: without using the eye as an infant (closed eyelid), the retina will not develop properly, therefore will not function)
- Sensation & Perception
  - o Parts of the eye and visual processing pathway in the brain
  - o Parts of the ear, from pinna to cochlea
  - o Taste and smell: organization and pathway from taste buds/olfactory receptors to brain
  - o Pain and Reflexes: what makes a reflex; how is pain processed in the nervous system?
- Movement
  - o Inhibitory and excitatory neural pathways
  - o Afferent and efferent processes
  - o Motor control areas of the brain: motor cortex, cerebellum, basal ganglia (dopamine!), and thalamus ("relay center")

Tips:

- No glossary definition recitations (phew!)
- Don't need to know both the chemical and commercial names of drugs
- Several questions on: neurotransmitter characteristics and roles, diseases and what causes them and therapies, how the senses "work", brain regions and general functions (example: hippocampus: learning and memory), sleep stages, cranial nerves, clinical imaging and recording devices, DNA, and some questions regarding historical findings and population statistics.
- Take a deep breath- you can do this! 😊

## Sample Email: Invitation to Judge

Dear Dr. Professor,

As Scientist has introduced to you, the students and scientists of the country Brain Bee Committee would be honored to have you participate in the national contest on Saturday, May 12th, not only to present the electrophysiology demonstration, but also to serve as one of the three neuroscientists on the Judging Panel. Alongside you would be Dr. Professor of City University and Dr. Professor of City University.

To provide you with some further information about the event, the Brain Bee is a friendly competition for students in grades 9-12 on topics of neuroscience, including neurological diseases, neuroanatomy, genetics, and the sensory systems. The main objective of the contest is to introduce students to neuroscience and provide for them an inspiring event that supports their efforts in learning about the subject. Most of the material is derived from the "Neuroscience: Science of the Brain" booklet that is published by the Dana Alliance.

The event will run from 13:30 to 17:30 on Saturday, May 12th, at the Clinic in city. Food and beverages will be provided throughout the event, and several tables will present various neuroscience demonstrations. Attached is the Announcement Letter that was sent to hundreds of science teachers and schools, if you are interested in further details, and even more information is available on the website, [www.website](http://www.website).

As a judge, during the verbal question and answer podium sessions, you would ask the questions from the question list, determine whether the student's response is within a reasonable range of the listed answer, and, if necessary, consult with the other two neuroscientists on the accuracy of the student's response if it is within range of being accurate. Further details can be provided later.

In short, we would be honored to have you participate as a judge. Please let us know, at your convenience, whether you would be able to fill this important role for our event.

Kind regards,  
name  
PhD Student, PhD Program  
Laboratory of Professor  
Center for Research  
City University Hospital

## Sample Email to Brain Bee Judges

Dear Brain Bee Judges,

Foremost, we sincerely thank you for volunteering your time and efforts to contribute to the Brain Bee this Saturday, the second annual national neuroscience competition for young students. We are very excited to have such an esteemed judging panel, and we hope you will enjoy the experience. The Committee has been working hard to deliver a successful event.

Venue: Main Auditorium, University Hospital, address.

The schedule for this Saturday's event is as follows:

schedule listed

Attached to this email is the set of rules for the podium sections. The two Podium sections are the live verbal question and answer sessions during which you will serve as a judge (14:20-15:00 and 16:45-17:15). A committee member will serve as the timekeeper and scorekeeper, as well. If you would like to partake in the additional competition sections, the Neuroanatomy and Patient Diagnosis, you are more than welcome. It is typical that students will have questions, and your presence would certainly contribute as a resource for the questions unanswerable by the committee members moderating the section.

In addition to the competition, we plan to have two demonstration tables available to interested students and guests during the breaks (about 12-15 guests will be joining the event). These include Dr. Professor's electrophysiology set-up and a sensory workshop component exhibiting touch and taste perception. Members of the Brain Bee committee and graduate students of the PhD program will be available to man these stations. Throughout the day, plenty of food and beverages, including coffee and tea, will be readily available.

The final student participant count is 25, representing 13 schools, so we are looking forward to a busy day with great competition!

If you have any questions or suggestions, please pass them along. We are dedicated to making this event the best possible, and your guidance is invaluable.

Kind regards,  
the country Brain Bee Committee  
cell phone:

## Brain Bee Rules 2012

### First Round Rules:

Participant order is randomly selected prior to event start.

All questions are based on the Dana Alliance publication "Brain Facts" and are randomly drawn from 3 hats. Questions are assigned "least difficult", "moderately difficult", and "most difficult".

The event is conducted in a manner similar to that of a spelling bee. When it is the participant's turn, they will approach the podium and be asked a question. Participants may request to have their question reread once. Following the final reading of the question, the participant will have 15 seconds to give their answer.

In the First Round, all participants will have the opportunity to answer a total of three questions separated into three rounds, as follows:

Round 1: 1 question per student (rated least difficult) each worth 1 point.

Round 2: 1 question per student (rated moderately difficult) each worth 2 points.

Round 3: 1 question per student (rated most difficult) worth 3 points.

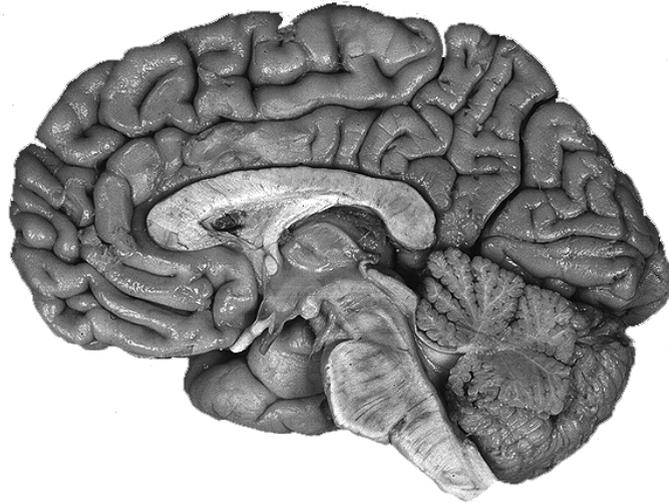
After the first four Sections of the competition, all scores will be tallied and the top ten competitors (more should a tie exist for the tenth position) will advance to the "Final Round".

### Final Round rules

The "Final Round" will be triple elimination, and the last competitor will be the official winner of the German National Brain Bee. Competitors will be asked 1 of the "least difficult" questions, followed by 1 of the "moderately difficult", while all questions after shall be randomly drawn from the "most difficult" box. After three incorrect answers, contestants return to the audience.

### General judging format

All three judges will be responsible for asking questions, one at a time and in a rotating fashion; additionally, one judge will raise a "Correct" sign; and one judge will raise an "Incorrect" sign. Judges may discuss whether a printed answer should or should not be the only correct answer, in case of advances in scientific knowledge since the date of publication or a "close-enough" answer by the contestant, etc. Judges may ask the student to elaborate on an answer, as long as the provided answer is not so vague and therefore, an insufficient answer. The timekeeper will be sitting near to the judges' table and shall begin the stopwatch once the question has been posed, with a pause in the case of a repeat reading. The scorekeeper and will be responsible for keeping track of points and raising signs during the Final Round to signify whether the student has missed one, two, or three questions. Upon the third miss during the Final Round, the student will return to their seat in the audience.



# *National Champion*

Brain Bee Neuroscience Competition

Germany

12<sup>th</sup> May, 2012



# *Certificate of Participation*

presented to

## Best Student

for successful participation in the Society for Neuroscience's Inaugural



conducted on January 31<sup>st</sup>, 2009  
at The Neurosciences Institute in La Jolla, California

---

Doug Nitz, PhD  
Brain Bee Committee Co-Chair

---

Julianne McCall  
Brain Bee Committee Co-Chair

# FIRST PLACE

of the Society for Neuroscience's Inaugural



## San Diego Brain Bee

Is proudly awarded to

---

on January 31<sup>st</sup>, 2009  
at The Neurosciences Institute in La Jolla, California

---

Doug Nitz, PhD  
Brain Bee Committee Co-Chair

---

Julianne McCall  
Brain Bee Committee Co-Chair

# German National BrainBee 2012

The  Hartmut Hoffmann-Berling

International Graduate School of  
Molecular & Cellular Biology

**H B I G S**



## Brain Bee Sample Press Release

Press Release: International Brain Bee: A neuroscience competition for young students

July 11, 2012; Baltimore, MD USA

Future neuroscientists from around the world will be meeting in Cape Town, South Africa to compete in the fourteenth International Brain Bee Championship on Sunday, July 22, 2012 in the Cape Town International Convention Centre. The Brain Bee is a neuroscience competition for young students, 14 to 18 years of age. It will be held in conjunction with the International Congress of Psychology. The competition has three tiers. Worldwide there are about 150 local competitions, each one involving many schools. The winners of the local competitions then compete in their respective national championships. The national winners then go on to represent their countries in the International Championship. They are tested on their knowledge of the human brain including such topics as intelligence, emotions, memory, sleep, vision, hearing, sensation, Alzheimer's disease, Parkinson's disease, schizophrenia, addictions and brain research. The competition involves oral tests, a neuroanatomy laboratory exam with human brains, a neurohistology test with tissue specimens and microscopes, and a patient diagnosis component with student actors. Sample questions include: What kind of molecules are semaphorin, ephrin, neuropilin and plexin? Sonic hedgehog is important for the development of what part of the nervous system? What is the medical term for when you start dreaming before you fall asleep? Stargazer mice are experimental models for which type of epilepsy? The winner will receive \$3000, a trophy, and the right to represent the Brain Bee around the world. The competing countries and their representative competitors are as follows:

Australia- Teresa Tang; Canada- Laronna Sewell; Germany- Sofia Amontova; India- Shivam Sanjay Panchalm; Italy- Flavio Miorandi; Kenya- Koki Mutungi; Malaysia- Ammar B. A. Mokhtar; New Zealand- Byung Cheol Cho; Nigeria- Okechie C. Chidera; Poland- Barbara Nowacka; Romania- Ionut Flavius Bratu; Singapore- James Alexander; United Arab Emirates- Shruti Suresh; United States of America- Aidan Crank; Wales- Ann Sebatian.

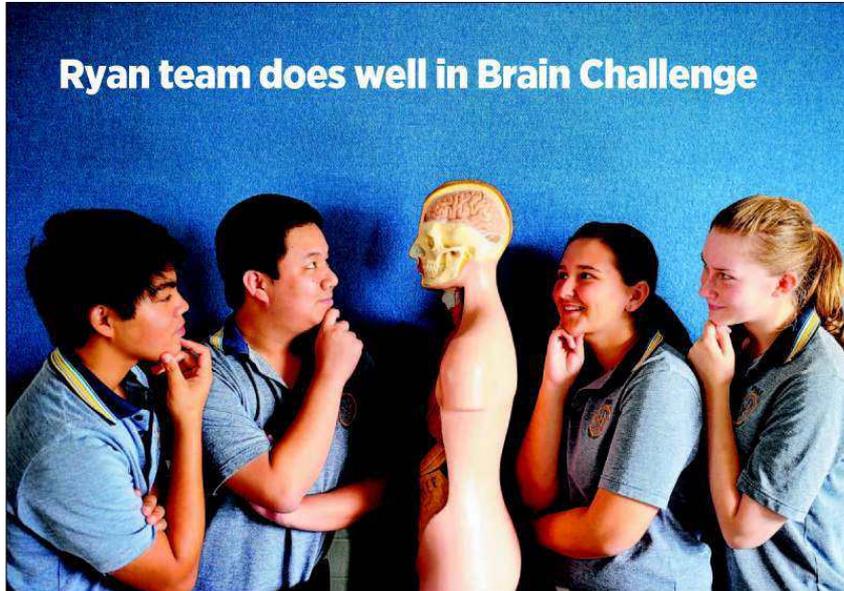
The purpose of the Brain Bee is to motivate young men and women to study the brain, and to inspire them to consider careers in the basic and clinical neurosciences. We need them to treat and find cures for the 1000 neurological and psychological disorders around the world. The International Brain Bee was founded and is directed by Dr. Norbert Myslinski ([nmyslinski@umaryland.edu](mailto:nmyslinski@umaryland.edu)) of The University of Maryland Dental School Department of Neural and Pain Sciences. The primary sponsor of the International Championship is Dr. S. M. Raju. We encourage neuroscientists and educators around the world to start a Brain Bee competition in their cities. It is easy and fun and the media loves it. Visit [www.internationalbrainbee.org](http://www.internationalbrainbee.org) <<http://www.internationalbrainbee.org>> for more information, or contact Steve Berberich ([sber001@umaryland.edu](mailto:sber001@umaryland.edu)).

The Brain Bee Builds Better Brains to Fight Brain Disorders.

This event is officially sanctioned by The International Brain Bee.

All rights reserved.

Use of the Brain Bee trademark, [cid:441F84CA-1E1F-4E23-BE6E-9998FA2017AA] , or the names "Brain Bee" or "International Brain Bee" by Official Brain Bee Chapters is permitted. Use by all others is forbidden without the permission of Norbert Myslinski, [410-706-7258](tel:410-706-7258), [nmyslinski@umaryland.edu](mailto:nmyslinski@umaryland.edu).



**BRAINY:** 15-year-olds Juan Pammit, Jack Su, Rachel Yanner and Caitlin Maloney from Ryan Catholic College made the Queensland Finals of the Brain Bee Challenge at the Queensland Brain Institute  
Photo: EVAN MORGAN

A GROUP of Ryan Catholic College students has been left buzzing after taking part in the Queensland state finals of the Australian Brain Bee Challenge.

Year 10 students Juan Pammit, Jack Su, Rachel Yanner and Caitlin Moloney recently out-smarted 1127 teenagers from across 60 Queensland schools in a multiple-choice neuroscience quiz to make the top 130 of the annual competition.

The youngsters travelled to the Queensland Brain Institute at the University of Queensland for the

state final last week, where they put in a creditable display to finish fifth in the teams challenge.

Ryan Catholic College science department head Belinda Coombe said the competition had already produced a number of benefits.

"The students took a lot out of the day because they had the chance to look at the facilities at the brain institute as well as taking part in the competition," she said.

"It was a real eye-opener for them to be able to see some of the research projects."

The students narrowly missed out on being offered a place in the Australian Brain Bee Challenge National Final, to be held on the Gold Coast next January.

Jack said the competition was a great opportunity to explore a career in the health care industry.

"The whole experience is more about looking at a career path for me because I hope to study neurology so I can become a brain doctor," he said.

**Ryan Matheson**



**Cairns Post**  
**30-Aug-2011**  
**Page: 23**  
**General News**  
**Market: Cairns QLD**  
**Circulation: 24053**  
**Type: Regional**  
**Size: 142.18 sq.cms**  
**Frequency: MTWTF--**

## Brain Bee Challenge state finals

By Caitlyn Jawai, Year 10, Woree State High School

MAKING mice glow was one of the interesting exercises undertaken by Caitlyn Jawai, Elyn Wone, Ronald Stark and Sou Vang on their visit to the Queensland Brain Institute at the University of Queensland.

They had travelled to Brisbane for the state finals of the national Brain Bee Challenge and were invited to complete three days of work experience in the university laboratories working alongside neurologists.

They were amazed to discover that when the mice were injected with a fluorescent protein (extracted from jellyfish), it gave them a vibrant glow under UV light.

One of the professors visited



**The Woree team get engrossed in the challenge.**

by the students specialised in spinal research. After paralysing a mouse's leg, he injected a protein that encouraged the nerves to grow back.

The mouse went from having a

paralysed leg to being able to use it again. This is, no doubt, going to have a huge impact on medical treatment in the future.

During a lecture by a neurobiologist, they learned about the new discoveries scientists are making by exploring the deep sea in submersibles.

Another interesting exercise was painting bees in an effort to study how they communicate with one another.

However, what amazed them most was that scientists are able to use their specialised adaptations in medical research.



Gladstone Observer  
03-Aug-2011  
Page: 15  
General News  
Market: Gladstone QLD  
Circulation: 7298  
Type: Regional  
Size: 585.76 sq.cms  
Frequency: MTWTFSS-

# Tannum grabs runner-up spot in Brain Bee contest

CONGRATULATIONS to Tannum Sands State High School Year 10 BSL Zenith students Zara Wagner, Linda Agyei-Yeboah, Heather Elliott and Emily Braithwaite for taking out second place in the team section in the Queensland finals of the Australian Brain Bee Challenge, held at the Queensland Brain Institute (QBI University of Queensland) last month.

The girls participated in the Brain Bee individual and team competitions, and toured the research facility, where they were able to view first-hand the research being undertaken at QBI.

Heather Elliott thought that "the most interesting part of the day was definitely the tours. It was interesting to see what it was like to work in a research lab". One of four highlights was a "glow-in-the-dark mouse", which had a GFP (green fluorescent protein) attached to the cells which control motor function.

This enabled the researchers to study the deterioration, movement and location of these cells throughout the life cycle of the mouse, and how the cells responded to various medication regimes.

Also of interest was when the students were shown the difference between the brain of a healthy human, and that of an Alzheimer's sufferer whose hippocampus was

almost entirely disintegrated.

"It was a truly awe-inspiring experience to see how these scientists were helping improve the way we live. Even though it does appear small and relatively insignificant at first, you see that it really does influence the big picture," Emily Braithwaite said.

Congratulations to Zara Wagner who made it to the final round of the individual challenge, placing sixth out of 120 participants, a highly commendable effort.

"Brain Bee gave me a whole new perspective on what I might want to do in the future," Zara said.

The first round of the team challenge was straight after lunch, and the Tannum team was anxious for proceedings to begin. Ten teams answered questions taken from the Brain Facts text, and Tannum was very pleased with their result, placing second with a score of 15 out of 20. It was then an anxious wait for the results of round two to find out if the score was enough to get them through to the final.

The team's hard work was rewarded by qualifying for the final in third place, where they competed against teams from the Queensland Academy of Maths, Science and Technology, and Brisbane State High School – formidable opposition indeed.

The first part of the final was an individual challenge involving one

student from each team. At the end of this round Tannum was in second place with a precarious one point lead over Brisbane State High. This set the stage for a nail-biting second round where teams would be able to consult and deliberate over their answers. For Linda Agyei-Yeboah, "the Brain Bee Competition was intense and fun and pushed me to limits I didn't know existed".

There were many tense moments with Tannum and BSHS levelling their scores, and Tannum then edging ahead with a correct answer for the next question. The final result was Qld Academies 1st, Tannum SHS 2nd, and Brisbane SHS 3rd.

Tannum's reward for achieving second place was a medal and certificate, an iPod Nano, and a UQ mug and cap each, as well as a Carl Zeiss ProStar microscope and a class set of Brain Facts text books for the school.

The BSL Zenith Team would like to congratulate and thank Zara, Linda, Heather and Emily for all the hard work and dedication they have put in over the past eight months preparing for the initial Brain Bee Quiz, and the State finals. They have spent many hours of their own time at lunch, after school, and in the holidays studying and preparing notes for each other. You truly deserve your success!



WELL DONE. Tannum Sands High School students Heather Elliott, Linda Agyei-Yeboah, Zara Wagner and Emily Braithwaite placed second in the State for Brain Bee Challenge at the Queensland Brain Institute. Photo: Corvachise

## Sample Press Release

### Singapore Brain Bee Challenge 2012

**Singapore Neuroscience Association (SNA)**, the National coordinator of IBB, has organized the Singapore Brain Bee Challenge 2012 competition successfully. This competition is a historical and important event as it is the first of its kind. The response from students of prominent schools in Singapore was overwhelming. About 140 students from 12 schools participated in the competition.

SNA had organized a series of events over the months of May and June 2012 as part of the Singapore Brain Bee Challenge. Firstly, an orientation session was conducted to introduce the young students to the brain and neuroscience. Assoc Prof Ng Yee Kong (Dept Anatomy) and Assoc Prof Sanjay Khanna (Dept Physiology, YLL SoM), from the Yong Loo Lin School of Medicine, NUS delivered lectures on brain and its functions to the young students from prominent schools in Singapore. The participating schools and junior colleges included Raffles Institution, National Junior College, Victoria Junior College, Anglo-Chinese (Independent) School, Hwa Chong Institution, Nanyang Girls High School, CHIJ St Nicholas Girls School, Dunman High School, River Valley High School, Cedar High School and Bukit Merah High School.

The written examination was conducted in the first week of June 2012. With over 140 examinees, a stringent protocol was followed to narrow down the top 9 finalists. The finalists had oral exam conducted by eminent neuroscientists in Singapore, namely, Prof Ling Eng-Ang, Assoc Prof ST Dheen, Assoc Prof Ong Wei Yi and Assoc Prof. Sanjay Khanna.

The National Brain Bee Champion was announced to be **Mr. James Alexander** from Raffles Institution (Junior College), in an Award Ceremony conducted on the 4 June 2012. The Champion received his award from the Guest of Honor, **Professor Barry Halliwell** the Deputy President (Research and Technology), National University of Singapore. The Champion was also awarded a cash prize of \$500 and a travel award of **\$2000** to attend the International Brain Bee Challenge held in Cape Town, South Africa between the 22-27 of July 2012. The 1st and 2nd runner up of the Singapore Brain Bee Challenge was awarded to **Ms. Carmen Chia Jia Yun** and **Ms. Yeow Pei Zhuang** from River Valley high School and Raffles Institution, respectively. During the Award Ceremony Professor Bay Boon Huat (Head, Dept Anatomy, YLLSoM) delivered a motivation talk titled "unleashing your potential".

This event was sponsored by the Department of Anatomy (YLLSoM, NUS), Lee Foundation, Kwang Im Thong Hood Cho Temple Trust.

# **Good luck!**