

YOUNG INVESTIGATOR TALKS BEGIN



On April 18th a new Bagadilico initiative saw the light of day, the Young Investigator Talks. The event inspired more young researchers to take part in the planning of future talks and the organization committee now consists of Irene Sebastianutto, Luis Quintino, Geraldine Petit and Josephine Malmevik. Here, Irene talks about what has motivated the new initiative.

What is the main idea behind starting up this activity?

- The main goal of the 'Young Investigator Talks' is to give the opportunity for young investigators within BAGADILICO to present their final work and discuss their findings "indoors" in front of an audience coming from almost the same environment, not being directly exposed to external judgment.

Why is it important to get young researchers talking to each other?

- We think that by talking to each other, young researchers can benefit on three levels; on the scientific level, as they can share knowledge and improve their own perspectives; on the network level, as it is possible to create collaborations and finally; on the social level as there is the opportunity to be part of an informal context which gives the possibility to appreciate the person and not just the scientist.

On April 18th, the first talk was held by Jenny Shin. How did it go?

- It went really well! Jenny was really kind and brave enough to accept to be the first speaker for this new adventure, which is exciting for us since it represents a new possibility for all BAGADILICO researchers to find a place and time where they can express themselves.

Where do people turn if they want to arrange an activity within this framework?

- They can contact us as the 'scientific board' for these events or Diana Jerman who is in charge of the research administration.

NEWS IN BRIEF

NEW TARGETS FOR CELL TRANSPLANTATION IN PD

New research indicates that it is not enough to transplant dopamine-producing cells in Parkinson's disease to alleviate all symptoms. Serotonin cells - controlling sleep, metabolism and mood - will likely have to be included in future transplants. The research findings are being published in the journal *Science Translational Medicine*. The study was conducted by Bagadilico's Anders Björklund and Olle Lindvall in cooperation with German and British researchers.

Using sophisticated cameras revealing the brain's different signaling systems, the researchers followed up on Parkinson's patients who received dopamine cells transplanted in the 90's. The patients transplanted with healthy dopamine cells showed significant improvement in movement skills. The patients' other symptoms, however, has continued to worsen.

- We still believe that neural transplants is a very promising option for treating Parkinson's disease. But to also relieve non-motor symptoms we will probably have to focus on the transplantation of more than just dopamine-producing nerve cells in the future, says Professor Olle Lindvall.

NEW CLUES ON CAUSES FOR DYSKINESIA

In a new report Elisabet Ohlin and her colleagues in the the Basal Ganglia Pathophysiology team have investigated the effects of L-DOPA on the parkinsonian brain from a new pathophysiological perspective. In the article entitled "Impact of L-DOPA treatment on regional cerebral blood flow and metabolism in the basal ganglia in a rat model of Parkinson's disease", the researchers describe how they found that treatment with L-DOPA caused large and transient increases in blood flow in the dopamine-denervated basal ganglia, and that such increases were much larger in animals exhibiting dyskinesias. Moreover, dyskinetic rats showed an elevated permeability of the blood brain barrier in the basal ganglia during the phases of augmented blood flow. Together, these observations offer non-neuronal clues to the mechanisms of L-DOPA-induced dyskinesia.

In patients with PD, it is known that treatment with L-DOPA causes an increased regional cerebral blood flow in the basal ganglia. The study by Ohlin et al. is noteworthy, because it has reproduced this clinically relevant phenomenon in a simple experimental model and has thereby unravelled its significance. Indeed, the use of this model has unveiled a maladaptive response of brain microvasculature to L-DOPA treatment. Thus the findings reported by these investigators identify the neurovascular unit as a potential new target for future treatments of L-DOPA-induced dyskinesias.

LU BIOIMAGING CENTER - INFORMATION DAY

Lund University Bioimaging Center (LBIC) has now been active with its complete experimental platforms for MRI, PET/CT, SPECT/CT and TEM for approximately half a year.

You are therefore cordially invited to the LBIC INFORMATION DAY on Tuesday, May 15, where representatives will inform and present to potential new users about the LBIC facilities now and in the future.

When and where: Tuesday May 15, 2012, 13.30 - 18.00, Segerfalksalen.

Register via email to Jenny.Mansson@med.lu.se no later than May 8.

MIND OVER GRAY MATTER

The Power of Bioimaging



TEXT: JENS PERSSON

As global funding for space exploration dwindles the quest for man's outer frontier is on the wane. The race to explore man's inner frontier, however, is only picking up. You may have missed it but we are in the midst of a revolution. Year by year, we are increasingly bombarded with awe-inspiring medical images through different outlets of popular culture. Be it television, art, news or movies, the colorful and detailed images of our innermost workings has forced the public to think differently about their bodies. The instant impact of graphic medical imagery has laid bare the limits and possibilities within the human body in a way never seen before. But what if these pictures are misinterpreted, or made to represent ideas and values beyond their scientific content? Who is responsible for the getting the right data across as images are emptied of their original analytical content and become symbols? Bagadillico's Max Liljefors investigates a land where medicine, culture and politics intersect.

Images of the brain and body have broadened the medical research community's paths of communication. Some might say it has created unfounded expectations on what medical research can achieve. Others may propose that it is an excellent way of getting the public's attention on hard-to-explain medical advances. It is clear, however, that medical imaging has advanced science itself, simply as a way of

analyzing and producing data. Max Liljefors quotes professor Anders Ynnerman in an effort to explain why imaging is fast becoming such an important tool in medical science.

- **Anders Ynnerman** describes imaging as the cooperation between computer and brain. A computer is very skilled at developing images from vast amounts a data while the human

brain is particularly apt in extracting layers of information from an image. It's a happy marriage that speeds up the analytical process, says Max Liljefors.

The scientific benefits of neuroimaging can hardly be understated. The use of different imaging techniques is an ever-growing field in medical science. Methods such as magnetic resonance imaging and PET-



Going Graphic. The picture shows pages from the journal Popular Science in chronological order, between 1882-2007. It's a powerful illustration of how visual science communication has become. The graph was put together by Dr. Lev Manovich.

scans are used for diagnostic purposes as well as in advanced experimental research. But how are these images presented to the public? What message do they convey when they stand alone, separated from their initial analytical framework. Undoubtedly it has made us more aware of our bodies, perhaps leading us to believe that we are defined, as humans, to a large extent by our biological and genetic restrictions. As we get the chance to peek into our brain in real time, in lively colours, perceptions of what constitutes us as human beings may begin to change.

Portraits of the Mind

One of Max Liljefors' projects is directed towards analyzing how neuroscience is presented in popular science, for instance in a book released in America, called 'Portraits of the Mind'. It is a coffee table book with stunning pictures of the brain aimed at the broader public, often inexperienced in the art of neuroimaging. The book has received rave reviews in distinguished newspapers and the author,

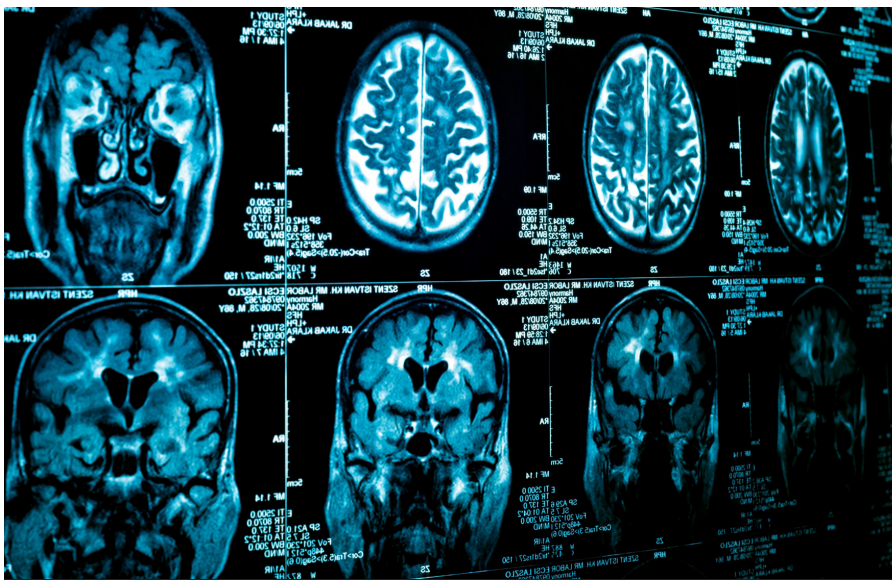
neurobiologist Carl Schoonover, is getting a lot of mainstream media attention. The message delivered in the book is that you are your brain and your brain is your mind. That sentiment echoes a broader philosophical debate prompted by recent advances in medical science. The book suggests that we are synonymous with our genetic and biological identities and that they define who we are and why we behave in a certain way. So, are we simply the sum of electric activity in our brain?

- **Science will**, by advances in genetics and neuroscience, make it more possible for humans to take control of their own destiny, to choose to be healthy, to choose to have healthy children. Even perhaps controlling happiness and contentment in life. This is the future that is indicated in the book, 'Portraits of the Mind'. Of course there is an opposing side, the critics, who say that there is a downside to the fast progress being made, if it goes unchecked. They might suggest, for example, that through genetic manipulation of

the brain we can be controlled at a biological level, into the body's smallest components. Others will say that genetic progress will prevent social progress since access to this technology will not be available to all.

Discussions on how we perceive our bodies, what constitutes us as human beings and the separation of brain and soul is older than neuroscience. But real life examples, resulting from technological innovation, have brought a new urgency to this ancient debate in the last few decades.

For example, the greyscale images of unborn children produced by ultrasound technology can now be turned into three-dimensional dolls that the soon-to-be-parents can hold in their hands. Critics say that this will add fuel to the fire in the controversial abortion debate, suggesting that fetuses may be perceived as complete human beings. The other side maintains that this technology will, for example, allow blind parents to create an emotional bond to their



Science Communication 2.0 Academia have realized the communicative power of images and are increasingly using them to report scientific advances.

unborn child. Here is an example where imaging technology forces a debate on sensitive issues, sparking discussions on how we fundamentally choose to define humanity and life.

Another example concerns a murder trial in the United States last year where the defense used a brain scan image to give credit to the stated mental condition of the accused murder. What would have otherwise most likely have ended with a death penalty sentence now lead to a more lenient punishment on account of the evidence put forward. As these images leave the research environment in which they are created and enter the judicial sphere, dilemmas concerning ambiguous human judgment may arise. A case could of course be made for questioning the analytical capability of a medically untrained juror that holds the faith of a defendant in his or her hands.

Max Liljefors believes that innovation in bioimaging will only speed up in the future. A few telling examples from the past decade help paint a picture of a world that is constantly changing along with technological imaging development.

- **After 9/11**, for example, border controls have intro-

duced biometric technologies that identify people by invisible physiological structures in their retinas and fingertips. Identification methods by voice patterns and even brain waves are also being researched. These are to a certain degree visualization techniques, although they do not create images in the common sense. Another example comes from the drone aircrafts being used by the U.S. in warfare. The next-gen drones will be equipped with a 1.8 gigabyte camera, which can identify 65 different moving targets independently at the same time from 20 000 feet. The images are immediately analyzed in a large computer system. There are numerous more examples where visualization technology is affecting different aspects of our lives and societies across the globe

Connecting with the Public

Captivating images from inside the body have without a doubt become an important instrument in the public relation strategies adopted by research institutions. As these images seep into popular culture public confidence in what science can achieve goes up. Since scientific reports are often difficult to break down to the layman, medical images have become a powerful tool to

communicate the promise that medical science holds. Many research institutions have understood this and they are utilizing it to get the public involved. For example, the Wellcome Trust, one of Great Britain's biggest funding organizations, hosts a massive public database with over 40 000 images available. They also arrange an annual event where the most fascinating images of the year are awarded with a prestigious prize.

- **Scientific organizations** are clearly beginning to understand the communicative value of medical images. I wouldn't say that they are using images in a cynical way to awe the public in order to get more funds but these images do not travel passively into culture. And of course, there is much to be gained from the public's fascination for graphic images of the brain and body. If the word on scientific progress is more effectively spread public opinion will support science funding to a greater extent.

Facing a near future where bioimaging technology is likely to take new bold steps it is difficult to predict in what direction we may be heading. Important scientific breakthroughs will likely continue to receive songs of praise and divisive debates on genetic identity and manipulation will probably rage on. The age-old questions about what is human are still, in essence, the same. The medical technology landscape of today, fuelling the debates, is clearly not.

- **It is part of** the human dilemma to have a contradictory relationship with the body. I think this is what is at the root of the fascination for medical imaging. It is horror mixed with excitement. Looking at images of the body's interior, you get access to what has always been an inaccessible dimension. Surely, that will get people's head to turn.

NEW STEM CELL FOUND IN THE BRAIN

Bagadilico researchers at Lund University have discovered a new stem cell in the adult brain. These cells can proliferate and form several different cell types - most importantly, they can form new brain cells. Now the researchers hope to put the discovery to use to develop methods that can repair diseases and injury to the brain.

Analysing brain tissue from biopsies, the researchers for the first time found stem cells located around small blood vessels in the brain. The cell's specific function is still unclear, but its plastic properties suggest great potential. A similar cell type has been identified in several other organs where it can promote regeneration of muscle, bone, cartilage and adipose tissue.

In other organs, researchers have shown clear evidence that these types of cells contribute to repair and wound healing. The scientists behind the study believe that the curative properties may also apply to the brain. The next step is to try to control and enhance stem cell self-healing properties with the aim of car-

rying out therapies targeted to a specific area of the brain.

- **Our findings show** that the cell capacity is much larger than we originally thought, and that these cells are very versatile, said Bagadilico's Gesine Paul-Visse, Associate Professor of Neuroscience at Lund University.

- **Most interesting** is their ability to form neuronal cells, but they can also be developed for other cell types. The results contribute to better understanding of how brain cell plasticity works and opens up new opportunities to exploit these very features.

The study, published in the journal PLoS ONE, is of interest to a broad spectrum of brain research. Future

possible therapeutic targets range from neurodegenerative diseases to stroke.

- **We hope** that our findings may lead to a new and better understanding of the brain's own repair mechanisms, said Dr. Paul-Visse.

- **Ultimately the goal** is to strengthen these mechanisms and develop new treatments that can repair the diseased brain.

THE STUDY:

'The Adult Human Brain Harbors Multipotent Perivascular Mesenchymal Stem Cells', published in: PLoS ONE, 16 April, 2012.

[Click Here to Read the Article](#)