



## “WORKSHOP ON TRANSFERRING TECHNOLOGY FROM BENCH TO BEDSIDE: PRACTICES, BARRIERS AND POLICIES”

The ultimate aim of biomedical research is the improvement of people's health and quality of life through the development of new therapeutic methods, diagnostic tools and health care. We are well aware, however, that the path from scientific discovery to beneficial applications for the patient - from 'bench to bedside' so to say - is costly, rife with failure, and lengthy.

The ERA-Net Neuron and its consortium partners are investing approximately 30 M€ in projects on neurodegenerative diseases of the central nervous system, mental health, and the development and advancement in methods and technologies towards the understanding of brain diseases. ERA-Net Neuron is particularly interested in understanding the flow of knowledge from bench to bedside as well as from bench to market in view of valorising its investment into neuroscience research. Within the frame of the ERA-Net Neuron programme, we brought together a range of practitioners (SMEs, Pharma Industry), policy-actors and academics in a workshop to discuss about the challenges of technology transfer. The workshop provided a forum for participants to share their experiences, analyses or thoughts on the practices, barriers and policy implications of technology transfer. Nowadays, knowledge and technology transfer is high on the agenda. We see it being discussed in medical technology for assisted living, diagnostic therapeutic technologies, public health applications, or molecular therapeutics for example. With the help of concrete project examples in different neuroscience application fields, we asked the speakers to comment on what are useful policy measures, best practices, programmes, etc. to improve the applicability and usability of knowledge in the life sciences?

### THE QUESTIONS THAT WE WANTED SPEAKERS TO ADDRESS WERE:

- What concept of technology transfer should we put to practice and work with?
- What are the best practices for technology transfer?
- What can we learn from success stories in the various fields?
- What makes technology transfer difficult?
- What are the barriers that have to be considered and surmounted?
- What types of measures and policy programmes are adapted to foster technology transfer?

The workshop was of practical policy relevance in that discussions are due to inform and improve policies and programmes for the consortium partners on the national level in this area and also within the ERA-NET Neuron II programme .





**Dr. Nora Tarcic**  
Senior Director of  
Drug Development at  
Teva Pharmaceutical  
Industries

### TECH TRANSFER AT TEVA | Dr. NORA TARCIC

Potential problems in transferring technology from an idea from Academia to a product used by a pharmaceutical company relates to their different perspectives: academia perspective is based on basic science and on the scientists' ingenuity and novelty, while in the industry perspective there is a constant need for breakthroughs from academia to solve real life problems with products that may be sold for profit.

The key to successful transfer of technology is effective communication. Equally important is an understanding of the expectations of the process and expectations what is needed to make this all possible. Strategies for overcoming barriers include cultivating support, planning, education, cost-benefit analysis, understanding organizational structure, facilitating change, being sensitive to the effects of technology on users.

Some of the "ways around these challenges" - researchers who spend time in the industry do better when it comes to dealing on a technology transfer deal [expectations and timing] and having a business body in the Academia to deal with the Biz aspects also facilitates communication between Academia and Industry.



**Dr. Morgan Meyer**  
Postdoctoral Researcher  
at the Centre for the  
Sociology of Innovation,  
Ecole des Mines de Paris

### FINDINGS SO FAR AND FOOD FOR DISCUSSION | Dr. MORGAN MEYER

Moving from "bench to bedside" (and back again) proves difficult. So how to improve the links between basic research and clinical research, between the laboratory bench and the bed of a patient in a hospital? Nowadays, efforts are put into increasing the use of knowledge and technology to produce medicines, tools, or treatments in order to better care for patients.

Many obstacles and barriers make it difficult to translate between bench and bedside. People sometimes talk about transfers being "lost in translation". These barriers include: the difficulty of moving from a model to humans; the heterogeneity and complexity of illnesses; ethical and practical considerations; language barriers and cultural differences between researchers and practitioners; debates around GMOs. Some even speak of a "discontinuity between the biological and the medical". To overcome this discontinuity, the importance of intermediaries, such as "clinician-scientists" - that is, people who speak two "languages" - is crucial.

Technology transfer raises a number of issues and challenges - cultural, technical, legal, political, financial, structural, etc., including, for instance: the produceability/marketability of products; the need for IP-related policies; for early dialogues between researchers and industry; for trusted advisory groups and confidentiality agreements; for centres/forums/networks; for joint projects between academy and industry.



Dr. Djalil Coowar  
CSO and co-founder of  
AxoGlia Therapeutics SA

## AXOGLIA THERAPEUTICS, THE FIRST BIOPHARMACEUTICAL COMPANY IN LUXEMBOURG: HYPE OR REALITY | Dr. DJALIL COOWAR

AxoGlia Therapeutics is the spin-off of a scientific collaboration between two academic institutions in Luxembourg and in Strasbourg. The research developed by the organic chemistry and neurobiology laboratories gave rise to innovative molecules with dual anti-inflammatory and CNS regenerative capacities. One compound proved to be active on an animal model of Multiple Sclerosis (MS) and AxoGlia was inceptioned to bring a drug candidate from these molecules up to late preclinical studies before an out-licensing to pharmaceutical companies. We decided to develop AxoGlia's activity in Luxembourg due to strong financing initiatives from the government who wants to develop the biotechnology sector. However, we have cumulated difficulties through the years of our drug development starting with the long delay in the negotiations with the academic institutions to in-license the patent of these compounds. After that, the pharmaceutical industry was less keen to in-license preclinical project for MS and we updated our business model to bring our lead candidate up to a clinical phase 2a. Problems then arose to finance this clinical development as new pharmacological data are now required by Venture Capitals to demonstrate the competitiveness of AGT0048 on the MS market. Five years after AxoGlia's inception, difficulties to develop a lead compound are still slowing down our evolution.



Dr. Phil Barker  
Professor in the  
Departments of  
Neurology & Neurosurgery  
and Anatomy and  
Cell Biology at McGill  
University, Chair of the  
Centre of Excellence in  
Commercialization and  
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## COMMERCIALIZATION RESEARCH AT THE MONTREAL NEUROLOGICAL INSTITUTE | Dr. PHILIP BARKER

The presentation from Phil Barker focused on Canada's Science and Technology plan and specifically examined the role of the Centers of Excellence in Commercialization and Research (CECR), a federal program designed to accelerate the commercialization of leading edge technologies, goods, services in priority areas where Canada can significantly advance its competitive advantage. One of these areas is neuroscience and the Montreal Neurological Institute (MNI) was an early recipient of CECR funding. The MNI received \$15M in funding and the presentation described the administrative and scientific oversight procedures that were established to use the funding to propel innovations likely to yield innovative commercial and translational developments. Cultural issues that act as potential barriers to successful commercialization program in an academic environment were identified and addressed. Over 30 projects were funded for one year, with most being renewed for 2nd and 3rd year funding. Projects that succeeded in the commercial domain were largely medical devices, device/software enhancements or those provided unique research services to the research or medical community.



Dr. Joyce Fung  
Associate Professor  
School of Physical and  
Occupational Therapy  
at McGill University

## INVENTION, RE-INVENTION, AND INNOVATIONS: FACILITATORS AND BARRIERS IN REHABILITATION TECHNOLOGY TRANSFER | Dr. JOYCE FUNG

There are many opportunities for technology transfer existing in physical medicine and rehabilitation, whereby the enhancement of functional recovery and quality of life is frequently considered. The health and well-being of a person depends on the complex interactions in physical, cognitive and social domains, which can be examined using the framework of the World Health Organization's International Classification of Functioning and Disability. Any impairment in body structures and functions can give rise to a disease that restricts a person's ability to perform daily activities and reduces a person's social participation, depending on the intricate, co-existing personal and environmental factors. The restoration of balance and mobility functions in stroke rehabilitation was used as an example to illustrate these complex interactions. An innovative motion base was invented to perturb upright balance during standing and walking in any combinations of six degrees-freedom-of-movement. Virtual environments were generated by computer graphical simulations and projected in 3D by optical instruments. A self-driven treadmill was instrumented on top of the motion base, and synchronized with scene progression to achieve an optimal sense of presence and immersion as a person walks in the virtual environment. Thus, a powerful system incorporating virtual reality technology was created for the evaluation and intervention of balance and mobility disorders. The potentials of maximizing functional gains with various biofeedback devices were discussed. The talk was concluded by discussing the contribution of research centres and networks, and the various roles assumed by funding agencies, academic and health care institutions, as well as industrial partners in the process of technology transfer.



Prof. Manfred Windisch  
CEO and founder of  
JSW LifeSciences

## DEVELOPMENT OF NANOPARTICLES TARGETING SPECIFIC BLOOD BRAIN BARRIER TRANSPORT SYSTEMS FOR IMPROVED DRUG DELIVERY OF ANTI-ALZHEIMER COMPOUNDS | Prof. MANFRED WINDISCH

Treatment of Alzheimer's Disease is so far an unmet medical need. During the last decade all new drug development programs for AD Failed. One reason is the blood brain barrier limiting the transport of active compounds to the target. To overcome this hurdle in this project participating groups are working with nanoparticles (NP) based on human serum albumin carrying specific ligands for transport systems in the BBB. Due to additional iron load transport, accumulation and degradation of these particles can be tracked by MRI. The NPs can be packed different active compounds. As a model the consortium is using an active compound which failed in clinical trials because of problems with BBB penetration Transgenic mouse models of AD will allow to verify the expected amyloid lowering effect of the drug. In case of a positive outcome these nanoparticles can be widely used, and the exchange of specific ligands will allow targeting individual brain areas of interest. Our approach could later also be used to develop new and specific imaging methods.