

PEN SPEAKS TO THE CO-ORDINATOR OF THE ENC NETWORK, **PROFESSOR ARJEN BRUSSAARD**, ABOUT THE IMPORTANCE OF A MULTIDISCIPLINARY APPROACH IN TRAINING THE NEXT GENERATION OF BRAIN DISEASE RESEARCHERS

Neuroscience network

The European Neuroscience Campus (ENC) Network is a network organisation of neuroscience centres in Europe and Canada with the aim to organise – and formalise – research collaborations in order to work together on grant acquisition strategies and to create exchange opportunities at all levels of education and professional work. The ENC academic home institutes all have a long and established track record in PhD training in the field of preclinical and clinical neurosciences.

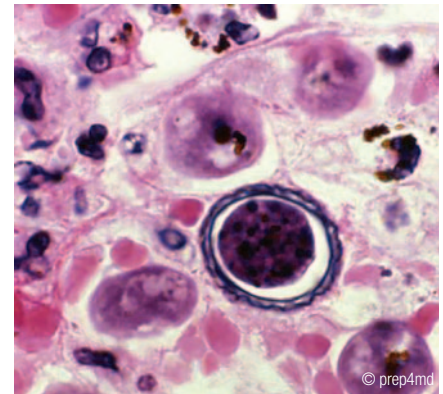
The four-fold mission of the ENC-Network is to understand the brain; to work on brain disease mechanisms; to promote graduate training and mobility; and to stimulate industrial-academic partnerships. However, this mission can only be achieved through transdisciplinary approaches. The ENC-Network therefore wants new generations of neuroscientists to be capable of integrating information across different disciplines. This means that they need to be trained by top scientists across Europe and should only participate in collaborative projects.

Pan European Networks spoke to the research director of the Neuroscience Campus Amsterdam, an ENC-Network home institute, and co-ordinator of the ENC-Network itself, Professor Arjen Brussaard, about the role that the network plays in developing the current understanding of the human brain and in training future generations of researchers who are flexible in their approach, multidisciplinary in their knowledge base, and excellent in the practice of their skills.

Why is it important to develop a European multidisciplinary neuroscience training network, what do you hope this will (continue to) achieve, and will this be sufficient to stem the brain drain Europe is currently experiencing in this field?

I would certainly have wanted this organisation to exist when I was embarking on my graduate studies. In the current context, the availability of data and the possibility to connect to opinion leaders in what could be termed the post-genomic era mean that the opportunities that such a network opens up to the emerging generations of scientists and researchers are continuing to grow.

Since the beginning of the network, we have appointed over 35 PhD students (with 22 more positions available in the coming academic year), and our objective remains to create an effective translational network. In addition, affiliated Marie Curie initial training networks (ITNs), such as BrainTrain, CerebNet and more recently CognitionNet have joined the ENC-Network initiative.



It is a huge pleasure for us to see new generations of neuroscientists (coming, to a large extent from outside Europe), to be trained in a mobile, flexible network, in which they visit at least two institutions for at least half a year during their training. The PhD students from the ENC-Network are very proactive, and they have also organised a pan-European PhD symposium this year, with more than 150 PhD students in neurosciences joining (details on this are available by searching for ENCODS online).

We also have dedicated senior professors who host joint PhD students, and after five years we are now more than ready to launch the next phase, and are set to begin selectively extending the network of ENC partners. Moving forward, there will be new calls for multi-cycle joint PhD programmes in Marie Curie, which has always funded such joint PhD projects, which are now also in Horizon 2020.

You mentioned that the network is attracting talent from outside of Europe, and may therefore be seen to be stemming the trend of brain drain that is being seen in some areas.

Yes, and one of the positive things about Erasmus Mundus is that co-ordinators must recruit five or six out of every nine students each year from outside of Europe, and are only allowed to include one student from each of



these non-EU countries. This serves to create an international body of students who continue to see each other during courses and meetings.

You mentioned the fluidity of the network and the way in which the students are able to spend time in different institutions. Do you think, then, that a move should be made towards a standardisation of practices, or that it is important to have these varied approaches in order to foster a more innovative approach?

From a basic graduate school point of view, the PhD projects need to be synchronised, but it is also important for the new generations of researchers being trained within the network to be conducting original research, and, as such, there is a common sense of what the challenges are.

Do the various challenges posed by the ageing demographic come into play here?

The ageing demographic and the problems involved therein are, indeed, a part of this. The shared ambition within the neurosciences community is to understand brain disease from a mechanistic point of view.

Professor Arjen Brussaard

However, to take the study of Alzheimer's Disease as an example, we apply what in many ways equates to old school science in many of the clinical trials taking place within the pharmaceutical industry. This, however, is beginning to change, as the pharmaceutical industry is beginning to pull out of the research and development domain to be replaced by academia and the biotechnology industry, who are trying to fill it.

Indeed, academia is now beginning to grasp the opportunity to fill this gap and to provide the translational capacity needed to deliver new insights into diseases of the brain, as well as the development of rational designs of new therapies in the brain.

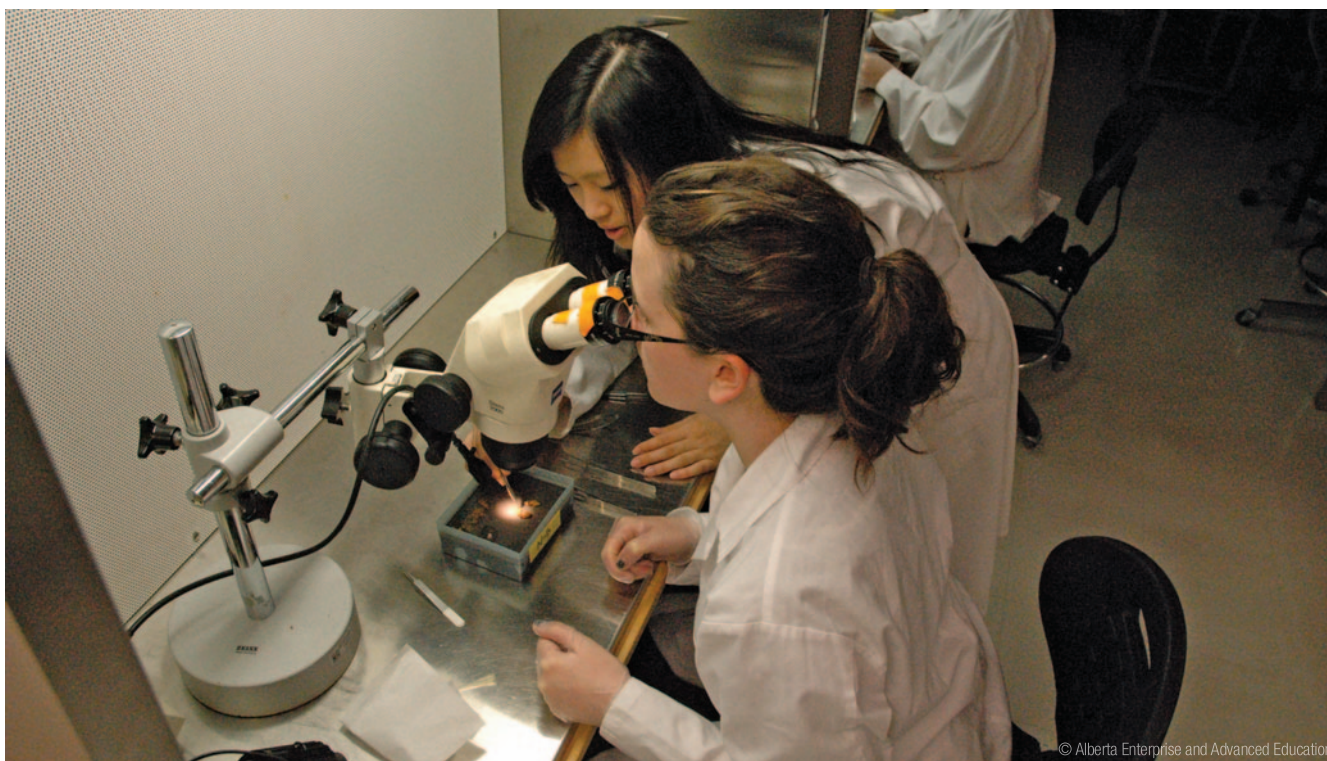
The ENC is certainly aiding in this, as we are able to provide access to human brain material in brain banks; we provide biomarker materials from spinal fluid, and ENC-Network students are therefore able to investigate the proteomics of the human brain, and that brings new insight.

Perhaps the biggest challenge is to provide a platform that allows for the realisation of these new insights, and we are therefore working not only to continue this network but also to try and involve industry as stakeholders.

Are you involved in the Human Brain FET project?

Yes, a number of my key opinion leaders are a part of this flagship. We are especially interested in helping the project consortium to build up the brain in a bottom-up type of approach, and so we provide the proteomic and the functional genomic elements of how synapses are constructed in the human brain.

The human brain is, of course, the largest organ in the human body that remains to be properly understood, but the impacts will not only



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be related to medicine, in that there are also societal issues that can be solved by coming to understand it, and I therefore applaud this initiative and the courage of the European decision makers who agreed to invest in it.

The Human Brain FET Project is already seen as an iconic project that is an inspiration to the new generations of neuroscientists and biologists, who can potentially become involved in the initiative as it develops.

However, hurdles still remain, and one of these certainly involves the industry-academia relationship. There is still work to be done in this regard, but it will not be enough to simply co-fund industry-academic partnerships, because there is a distinct sense that this needs to be approached in a 21st Century fashion. Indeed, if we are able to create an open innovation consortium, academia and industry will be able to work hand in hand on shared ideas, and success may well follow.

Do you think that enough is being done at the EU level in/to promote the field of neuroscience (perhaps regarding both research and policy)?

A Joint Programming Initiative concerning neurodegeneration would be spectacular if it is successfully achieved, but this may still be some way off. Nevertheless, the very fact that this issue has been placed on the European agenda is a very positive step forward. Different national initiatives are emerging to make money available for this, which means that it would be timely for this to be matched at the European level, because the problem of neurodegeneration is inextricably linked to the ageing demographic which is, of course, a problem that will be felt right across Europe.

Out of every group of ten people who will come to celebrate their 80th birthday, four of them will experience some form of neurodegeneration. If the healthcare costs from that are projected, at the national level in

the Netherlands by 2040, approximately half of the entire health budget will be needed to tackle just this problem alone. That is about €40bn for a population of 18 million people. If that is extrapolated to the European level, it is clear that this is a significant problem.

It is not that we do not know how to solve it; we just need the translational power of biology and neurology to make the rational, yet urgent, step forward.

This step is beginning to occur: there are two types of PhD student in the ENC-Network: those coming from biology who begin to get interested in the human brain, and medical doctors who have a personal interest in brain disease. This alone demonstrates that the willingness to work together on this type of endeavour is already in place, and I am now waiting for the move to be made proactively on the European side to take this forward.

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