group of eight has started. How do the two laureates see their own future? Milou: "My ambition is to continue in PTSD research, but I would also like to increase my skills and knowledge in clinical psychology. Combining research with clinical practice seems an ideal blend, contributing to scientific progress and making the difference for the individual patient." Whether Jacques will be in Utrecht 5 years from now is questionable. "One of my dreams is to be in Cambridge, not just because one of the biggest names in the field of impulsivity is situated there but also because I am a big Physics aficionado and would be overjoyed to attend/work in the same University as Isaac Newton, Paul Dirac and Stephen Hawking, amongst others." Brain Center Rudolf Magnus welcomes these two young talents!

New research group leader Elly Hol: focus on stem cell qualities of astrocytes

Investigating a troubleshooting star

Text Manou van de Zande

HER CELLS ARE THE GLIA CELLS, AND HER SPECIFIC STAR AMONG THEM IS THE ASTROCYTE. MEDICAL BIOLOGIST AND NEW RESEARCH GROUP LEADER ELLY HOL IS ESPECIALLY INTERESTED IN THEIR RACE TO THE RESCUE WHEN THE BRAIN IS DAMAGED. HOW TO PUT THIS CHARACTER TRAIT TO GOOD USE?

"The astrocyte is a busy and multi-functional cell, neglected way too long by neuroscientists", says Elly Hol. It dips its many long tentacles – hence the nickname 'star' – into all kinds of neuronal processes. In humans, it communicates with two million synapses in order to send neurons (attached to one of its tentacles as well) on their merry way, it makes sure all things living attached to it are fed – a multi-talent indeed. Together, all astrocytes form a gigantic network, constantly exchanging information. The astrocyte is also a troubleshooter, and speeds towards problem zones when the brain is damaged, be it by a stroke, a psychiatric condition, Alzheimer or Parkinson's disease.

But, as Elly Hol's previous research showed, there's a problem attached to this first aid-feature: it causes the astrocytes to forget their directing-neurons-task. And some of the neurons in their care go off in wrong directions as a result, causing damage elsewhere. Something else happens too: during their trek towards the mayhem, some of these astrocytes evolve back into being stem cells. Our brain also harbours a special astrocyte, which lives near the ventricles, and these cells act as stem cells, as Hol and her previous Amsterdam group have proven in human brains' material and mouse models. "One of our goals now is to find ways to steer and stimulate these astrocytic stem cells to repair broken nerve cells, enabling the brain to 'cure' itself."

The particular knowledge and skills she has built up over the last twenty years is valuable for all fields of expertise that Brain Center Rudolf Magnus houses: stroke, brain tumors, vascular dementia and psychiatric conditions. "I like translational work, so it's good to be close to clinicians here."

Techniques that matter

Hol and her investigators work with human brain tissue a lot – from donor brains stored in the Netherlands Brain Bank. From the fresh ones (used within six hours after the death of a donor), stem cells can be extracted and kept alive in a dish. Fluorescent Assisted Cell Sorting (FACS) plays a part in this process. "This technique is a way of labeling cells with different colors, and then, with laser devices, steering cells of one kind into their own petri-dish. FACS is already in use in immunology, and now we also use it for extracting stem cells and microglia from brain tissue."

Elly Hol

Man is no mouse

As a professor and teacher, Elly Hol ventures outside academia a lot. One of the things she does is tempering too high expectations, for example stressing that a lab mouse is only a little bit similar to a human being. "It's important to realize that mouse- and human brains differ a lot from each other. A promising find may work in a mouse model, but not – at least not in a similar way – in humans. Not only because the two species are different, but also because lab mice are usually inbred families, living in artificial conditions, very unlike us much more genetically varied humans. Just recently a study showed that a potential medicine for Alzheimer looked promising in rodents, but did nothing in human, iPS-created neurons. This is one of the challenges we have to face."

"What I would like to do, is to learn more about the FACSsorted cells to develop specific tracers for molecular imaging, to label for example astrocytes, and follow these as a group – in a living creature, be it mouse or man – to see what their routes and actions are when brain damage occurs. To make these routes visible would make us understand the astrocyte better."

Elly Hol was appointed group leader at Brain Center Rudolf Magnus in October 2013. She's also professor of 'Biology of Glia and Neural Stem Cells' at the University of Amsterdam. Between 2003 and 2013 she was group leader at the Netherlands Institute for Neuroscience, where she still holds an appointment as guest researcher.

Children welcome in Utrecht!

ALONGSIDE THE UTRECHT UNIVERSITY RESEARCH THEME DYNAMICS OF YOUTH AND THE NWO GRAVITATION GRANT ON INDIVIDUAL DEVELOPMENT, UTRECHT HAS RECENTLY OPENED A 'KINDERKENNISCENTRUM'. WHAT IS THE PURPOSE OF THIS CENTER? WE ASKED CHANTAL KEMNER, MOTOR BEHIND ALL THESE INITIATIVES, TO ENLIGHTEN US.

"The primary goal of the Center is to be the home and operating base for two cohorts in Utrecht; cohorts on the development of individual differences in behavioral control and social competence. We focus on the role of child characteristics in the light of environmental factors, and how these factors influence brain and behavioral development. This work is intertwined with the Utrecht University strategic theme Dynamics of Youth", explains Chantal Kemner enthusiastically. "It all comes together: the NWO Gravitation grant on Individual Development (CID), which links us to other Dutch groups investigating the development of children; and the Utrecht strategic theme Dynamics of Youth in which nearly all faculties of Utrecht University are involved. The KinderKennisCentrum is the physical precipitation of these two large activities."

Chantal Kemner

Publications

More than 20 Top 10% papers have been published by investigators from the Brain Center Rudolf Magnus in the months February 2014 - April 2014. For a recent update of our top publications, see *http://research.umcutrechtkindercentrum.nl/researchers/news/*

Some highlights:

Stopping antiepileptic drugs in seizure-free patients.
Braun KP, Schmidt D.
Curr Opin Neurol. 2014 Apr;27(2):219-26.

Dynamic adaptation of large-scale brain networks in response to acute stressors.
Hermans EJ, Henckens MJ, Joëls M, Fernández G.
Trends Neurosci. 2014 Apr 21. pii: S0166-2236(14)00045-9. Review.

Correlation between structural and functional connectivity impairment in amyotrophic lateral sclerosis.
Schmidt R, Verstraete E, de Reus MA, Veldink JH, van den Berg LH, van den Heuvel MP.
Hum Brain Mapp. 2014 Mar 6. doi: 10.1002/hbm.22481. [Epub ahead of print]

A role for Bicaudal-D2 in radial cerebellar granule cell migration.
Jaarsma D, van den Berg R, Wulf PS, van Erp S, Keijzer N, Schlager MA, de Graaff E, De Zeeuw CI, Pasterkamp RJ, Akhmanova A, Hoogenraad CC.
Nat Commun. 2014 Mar 11;5:3411. doi: 10.1038/ncomms4411.

Functional differences in emotion processing during adolescence and early adulthood.
Vink M, Derks JM, Hoogendam JM, Hillegers M, Kahn RS.
Neuroimage. 2014 Jan 25. pii: S1053-8119(14)00056-1. doi: 10.1016/j.neuroimage.2014.01.035. [Epub ahead of print]