NeuroCampus – Inside Out:

Hatice Tankisi

Group Leader at Department of Clinical Neurophysiology, Clinical Medicine

Tankisi and her colleagues are engaged in the development and testing of new neurophysiological methods in order to improve diagnosis, treatment and monitoring of neurological diseases with a special focus on amyotrophic lateral sclerosis (ALS).

Hatice Tankisi. Photo: Karoline Klitgaard

Can you describe your research in a nutshell?

As neurophysiologists, we are concerned with the functioning of the entire nervous system. The neurologists see the patients and based on their observations, the patients are referred to us for a neurophysiological examination. My main research interest is to explore new neurophysiological methods that can explore nerve structures that cannot be examined with traditional methods, while simultaneously being both faster, more cost-effective and user-friendly. For the past six years, I have been collaborating with Prof. Hugh Bostock, from the UK, who has developed a unique new method for measuring the number of nerve fibers in a nerve using electrical current. My knowledge from neurophysiology means that I have an insight regarding the needs of the field as well as the limitations of traditional methods, while Prof. Bostock brings all the technical knowledge. In collaboration, we have been continuously developing this method and multiple multinational centers are now working with exploring the possibilities of measuring number of nerve fibers.

What translational impact may your research have for people?

My work mainly focuses on amyotrophic lateral sclerosis (ALS) and our estimating the number of nerve fibers method can be useful in regards to ALS in different ways: One of the big problems with ALS is that the disease is often diagnosed so late in the process that the currently available drugs has no effect. Using numbers of nerve fibers as a biomarker makes it easier to make an earlier diagnosis of ALS. A wide range of drugs has been developed and tested in the hope of treating ALS but often with no or little effect. It can however be difficult to decide whether the drugs are effective, when the outcome is limited to subjective questionnaires from the patients. Instead, it is possible to measure the effects more directly by looking at e.g. the nerve fibers. Similarly, this strategy can be also be used to track the progression of the disease by continuously monitoring the number of nerve fibers.

In addition to working with the nerve fiber method, we have also been engaged in creating a new version of the transcranial magnetic resonance technique, called threshold-tracking TMS. This version of the method is more sensitive, automated and less uncomfortable than traditional TMS. Threshold-tracking TMS can be used for diagnosing of ALS, and additionally have potential important treatment-related implications related to depression and dementia. A lot more research is however needed in this area.

How did you end up where you are today?

When I did my neurology training back in Turkey, I realized that I wanted to be a clinical neurophysiologist. This led me to move to Denmark, where the neurophysiology is very advanced and most of the methods have been developed. Here I did my PhD under the supervision of Prof. Anders Fuglsang-Frederiksen. Meeting Hugh Bostock six years ago has influenced my career greatly, both in regards to gaining a lot of valuable new perspectives and in relation to building a large, international neurophysiology network with experts from all around the world.

What does a (local) strong neuroscience research network mean for you and your research?

Internationally, I mainly collaborate with other neurophysiologists, but locally at the hospital, I engage in a lot of interdisciplinary work. We have collaborators at for instance the pain center, among the neurologists and lately we have had an interesting collaboration with the infectious diseases concerning the post COVID-19 fatigue, which appears to be related to myopathy. This has involved a broad exploration of both muscles, genetics, lungs etc.

Despite having many fruitful collaborations with other clinical researchers, I would love to expand my collaborations to also include a network of basic researchers here at AU. I am happy to have become a part of NeuroCampus, with the possibilities it brings of creating new collaboration opportunities.

If you had unlimited resources to conduct a big, multidisciplinary neuroscience project, what would you like to do?

I would like to conduct a large multidisciplinary study exploring the underlying disease mechanisms of ALS. This would require a gathering of all clinical and basic experts in the field from the entire world. I think this could help us discover manyimportant new drug targets related to the disease.

I believe that genetics play a big role in ALS, and I would like to investigate this with both animal and human models. So much is still left to know about the disease, and having a large multidisciplinary collaboration would bring us a lot further in helping patients suffering from ALS as well as all other diseases.

Contact:

- Hatice Tankisi, Clinical professor, PhD
- Address: AUH, Palle Juul-Jensens Boulevard 165, J209
- E-mail: hatice.tankisi@clin.au.dk
- PURE profile

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