Katedry biochémie a genetiky PriF UK
a občianske združenie *NATURA*

Vás pozývajú na 120. prednášku v rámci Kuželových seminárov:

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CEREBROSPINAL FLUID BIOMARKERS AND MACHINE LEARNING HELP US UNDERSTAND BIOLOGY AND PATHOLOGY OF MULTIPLE SCLEROSIS

ktorá sa uskutoční **25. mája 2021** (utorok) o **16:00**

ako webinár: meet.google.com/pjt-tstf-vcr

http://www.naturaoz.org/seminare.html
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Mgr. Peter Kosa, PhD.

1998-2003
Faculty of Natural Sciences, Comenius University, Bratislava, Slovakia, MSc. in Chemistry
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Lecture annotation:
Multiple Sclerosis (MS) is an immune-mediated disease of the Central Nervous System, affecting approximately 2.5 million people worldwide. In MS, body's own immune system attacks myelin sheaths that works as fatty insulator of nerve axons. Due to this demyelination, the conduction of electrical impulses along axons gets interrupted, resulting in variety of clinical symptoms, ranging from vision problems, muscle weakness, bowel and bladder dysfunctions, pain, to loss of ambulation. Early stages of MS are characterized by relapses, sudden loss of one or more functions, that can be reversed, and patients enter remission phase. As the disease progresses in time, the frequency of relapses decreases, and the disease course shifts towards progressive stage, characterized by neuronal loss, and steady accumulation of irreversible disability. There are many challenges associated with MS: the cause of the diseases still remains unknown, current diagnosis of MS is based on exclusion of other possible neurological diagnosis, currently available FDA-approved treatments targets inflammation, but not the pathophysiological processes associated with neurodegeneration and as a result, they are not curative, and finally, clinical trials of new potential therapies lack sensitive outcomes that would allow screening of new drugs in small and short phase II trials. Our group has spent a lot of effort on addressing many of these challenges; first, by developing a battery of new, more sensitive clinical outcomes to measure disability progression in MS patients, second, by developing a biomarker-based molecular diagnostic test of MS with 98% specificity, and third, by generating and validating biomarker-based models predicting future disability progression in MS patients. Our ongoing projects include smartphone-based suite of Apps that measure various neurological deficits, with the aim of collecting patient-derived granular data that can be used to recreate many aspects of a traditional neurological exam. We also run a biomarker-guided clinical trial that tests multiple drugs and their combination targeting identified pathological processes that contribute to disease progression of MS patients.

Selected publications:

1. Pham L, Harris T, Varosanec M, Morgan V, **Kosa P**, Bielekova B. Smartphone-based symbol-digit modalities test reliably captures brain damage in multiple sclerosis. NPJ Digit Med. 2021 Feb 24;4(1):36. doi: 10.1038/s41746-021-00401-y.
2. **Kosa P**, Barbour C, Wichman A, Sandford M, Greenwood M, Bielekova B. NeurEx: digitalized neurological examination offers a novel high-resolution disability scale. Ann Clin Transl Neurol. 2018 Sep 24;5(10):1241-1249. doi: 10.1002/acn3.640.
3. Barbour C, **Kosa P**, Komori M, Tanigawa M, Masvekar R, Wu T, Johnson K, Douvaras P, Fossati V, Herbst R, Wang Y, Tan K, Greenwood M, Bielekova B. Molecular-based diagnosis of multiple sclerosis and its progressive stage. Ann Neurol. 2017 Nov;82(5):795-812. doi: 10.1002/ana.25083.
4. **Kosa P**, Ghazali D, Tanigawa M, Barbour C, Cortese I, Kelley W, Snyder B, Ohayon J, Fenton K, Lehky T, Wu T, Greenwood M, Nair G, Bielekova B. Development of a Sensitive Outcome for Economical Drug Screening for Progressive Multiple Sclerosis Treatment. Front Neurol. 2016 Aug 15; 7:131. doi: 10.3389/fneur.2016.00131.
5. **Kosa P**, Komori M, Waters R, Wu T, Cortese I, Ohayon J, Fenton K, Cherup J, Gedeon T, Bielekova B. Novel composite MRI scale correlates highly with disability in multiple sclerosis patients. Mult Scler Relat Disord. 2015 Nov;4(6):526-35. doi: 0.1016/j.msard.2015.08.009.