LÁSZLÓ SIKLÓS

Neurobiology Unit, Institute of Biophysics
Biological Research Center

Address: Temesvári krt. 62., H-6726 Szeged, Hungary

RESEARCH AREA

The saying originating from the US at the beginning of the previous century *"A picture is worth a thousand words"* is particularly adequate for the description of the complexity of the brain. A new discipline, called geometrical statistics, is used now by micro-anatomical photography to derive unbiased data characterizing the number, size, specified surface portions, etc. of nerve cells by using tiny samples from an enormously high population (≈ 200 billion) of neurons constituting the brain.

The results of such investigations either may contribute to the interpretation of the industrial amount of data coming from (sometimes) automated molecular biology instruments, or may substitute those, when variations of biological functions should be attributed to distributional instead of quantitative changes in e.g. gene expression. The development of biological micro-structural investigations is undoubtedly motivated by a typical human desire expressed by *"seeing is believing"*. This is most obvious in the regular need of seeking the structural correlates of the results obtained by another cutting edge technology, electrophysiology.

Our micro-anatomical research is aimed to derive quantitative data characterizing nerve cells in healthy conditions, during disease and ageing, which are also suitable to measure the effect of treatments aimed to halt or reverse disease progression.

TECHNIQUES AVAILABLE IN THE LAB

Basic methods in structural investigations (light, fluorescent, and electron microscopic techniques), sample preparation methods for biological structural research, labeling techniques for molecular imaging, statistical basis of sampling for unbiased quantitative microscopy, derivation of biological relevant three-dimensional parameters from biological tissue, interactive and automatic computer assisted image analysis, image analysis programming languages.

SELECTED PUBLICATIONS

Patai, R., Nógrádi, B., Obál, I., Engelhardt, J.I., **Siklós, L.** (2017) Calcium in the pathomechanism of amyotrophic lateral sclerosis – taking center stage? **Biochem Biophys Res Comm 483:** 1031-1039.

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Paizs, M., Tortarolo, M., Bendotti, C., **Siklós, L.** (2011) Talampanel reduces the level of motoneuronal calcium in transgenic mutant SOD1 mice only if applied presymptomatically. **Amyotroph Lateral Scler 12:** 340-344.

Paizs, M., Engelhardt, J.I., Katarova, Z., **Siklós, L.** (2010) Hypoglossal motor neurons display reduced calcium increase after axotomy in mice with upregulated parvalbumin. **Comp Neurol 518:** 1946-1961.

Paizs, M., Engelhardt, J.I., **Siklós, L.** (2009) Quantitative assessment of relative changes of immunohistochemical staining by light microscopy in specified anatomical regions. **Microscopy (Oxford) 234:**103-112.

Beers, D.R., Henkel, J.S., Xiao, Q., Zhao, W., Wang, J., Yen, A.A., **Siklós, L.**, McKercher, S.R., Appel, S.H. (2006) Wild type microglia extend survival in PU.1 knockout mice with familial amyotrophic lateral sclerosis. **Proc Natl Acad Sci USA 103:** 16021-16026.