
Laboratory of Quantitative Histology

Offer

- Histological sectioning for routine stains as well as for immunohistochemistry (coated slides)
- Identifying and testing continuous variables for quantification and morphometry of tissue samples according to the biological questions of our research partners (pilot studies with small sample size as well as full studies)
- Analyzing the sources of biological variability between groups of histological samples as well as within large tissue samples or even whole organs by comparing tissue samples representing the same organ and by comparing series of spatially correlated histological sections
- Performing pilot and feasibility studies for sample size calculation and to find out the expected differences between groups of experimental animals
- Evaluating sampling strategies by using systematic uniform random sampling at the level of tissue blocks, histological sections and microscopic image fields; calculating the sampling error and suggesting an efficient sampling strategy for histological study
- Assessment of bright field and fluorescence-labelled histological samples delivered to our lab
- Quantification of numerical density, quantification of length, surface area, volume of histological objects using unbiased stereological methods; microvessel density, area and volume fractions of multiple phases, clustering of objects, tortuosity of linear structures (fibres, microvessels)
- Quantitative assessment of photomicrographs, laser scanning confocal microscope stacks from biomedical or material research including tissues and bioengineered scaffolds
- Basic parametric and non-parametric statistics based on data from quantitative histological studies, testing hypotheses using t-test, ANOVA, Mann-Whitney U test, Wilcoxon matched pairs test, KruskalWallis ANOVA, Friedman ANOVA, correlation analysis
- Writing research reports on quantitative histology using methods, photomicrographs and summarized results of tissue samples analysis according to standards of peer-reviewed journals

Research Area & Excellence

The laboratory deals with design-based unbiased stereological techniques applied for quantitative analysis in histopathology. Tissue blocks and organs are processed and analysed using systematic uniform random sampling of blocks, sections, and fields

of view. The morphometry is performed using continuous variables. Thus, groups of samples under study may be compared in an unbiased way using standard statistical procedures for testing various biological hypotheses.

Members

- Assoc. Prof. Zbyněk Tonar, M.D., Ph.D., M.Sc. – Research Group Leader
- Jiřina Havránková, B.Sc.
- Yaroslav Kolinko, Ph.D., M.Sc.
- Tereza Kubíková, M.Sc.
- Anna Malečková, M.D.
- Markéta Šlajerová, M.Sc.

Selected Publications

- Houdek K, Moláček J, Třeška V, Křížková V, Eberlová L, Boudová L, Nedorost L, Tolinger P, Kočová J, Kobr J, Baxa J, Liška V, Witter K, Tonar Z. *Focal histopathological progression of porcine experimental abdominal aortic aneurysm is mitigated by atorvastatin*. International Angiology. 2013; 32: 291–306
- Nedorost L, Uemura H, Furck A, Saeed I, Slavik Z, Kobr J, Tonar Z. *Vascular histopathologic reaction to pulmonary artery banding in an in vivo growing porcine model*. Pediatric Cardiology. 2013; 34: 1652–60
- Eberlová L, Tonar Z, Witter K, Křížková V, Nedorost L, Korabečná M, Tolinger P, Kočová J, Boudová L, Třeška V, Houdek K, Moláček J, Vrzalová J, Pešta M, Topolčan O, Valenta J. *Asymptomatic abdominal aortic aneurysms show histological signs of progression: a quantitative histochemical analysis*. Pathobiology. 2013; 80: 11–23

- Plencner M, East B, Tonar Z, Otáhal M, Prosecká E, Rampichová M, Krejčí T, Litvinec A, Buzgo M, Míčková A, Nečas A, Hoch J, Amler E. *Abdominal closure reinforcement by using polypropylene mesh functionalized with poly-ε-caprolactone nanofibers and growth factors for prevention of incisional hernia formation*. International Journal of Nanomedicine 2014; 9: 3263–3277
- Veselá P, Tonar Z, Sálek D, Vokurka S, Trněný M, Kodet R, Moulis M, Kašparová P, Vernerová Z, Velenská Z, Stříteský J, Michal M, Boudová L. *Microvessel density of mantle cell lymphoma. A retrospective study of its prognostic role and the correlation with the Ki-67 and the mantle cell lymphoma international prognostic index in 177 cases*. Virchows Archive. 2014; 465: 587–597

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Experts and their Department

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