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# doc. RNDr. Pavel Souček, CSc.

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## Advisors:

Doc. RNDr. Pavel Souček, CSc.  
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Mgr. Viktor Hlaváč, PhD

## Description of scientific activity

The Department of Toxicogenomics of the National Cancer Institute deals with complex research on the influence of molecular factors (genomics, epigenomics, transcriptomics, proteomics and metabolomics) on the development of cancer and the course of oncological diseases. One of our goals is to understand the development of cancer and use its characteristics to define therapeutically relevant tools to reverse or slow its progression and ultimately contribute to the development of targeted drugs and regimens that specifically target cancer cells. We are looking for clinically interesting prognostic and predictive biomarkers in the tissues and blood of cancer patients to assess the risk of disease recurrence and the response of cancer patients to therapy (precision oncology). Using model cancer cell lines, we are investigating the mechanisms of action of known and experimental anticancer drugs and looking for ways to enhance their therapeutic effect or reduce tumor resistance. Furthermore, we are studying new drugs that have not yet been included in clinical trials and we are developing in vivo models of cancer, including patient xenografts. Our excellence is based on more than 20 years of experience in this field, supported by a number of projects including international projects (see selected projects), published scientific papers (see selected publications) and broad international collaborations (see selected collaborations).

## Selected publications

Kludová-Spálenková A, Holý P, Souček P. Oxysterols in Cancer Management: From Therapy to Biomarkers. *Brit J Pharmacol.* 2021;178:3235–3247. doi: 10.1111/bph.15273.

Hlaváč V, Holý P, Souček P. Pharmacogenomics to Predict Tumor Therapy Response: A Focus on ATP-Binding Cassette Transporters and Cytochromes P450. *J Pers Med.* 2020;10(3):E108. doi:10.3390/jpm10030108.

Bleach R, Madden SF, Hawley J, Charmsaz S, Selli C, Sheehan KM, Young LS, Sims AH, Souček P, Hill AD, McIlroy M. Steroid ligands, the forgotten triggers of nuclear receptor action; implications for acquired resistance to endocrine therapy. *Clin Cancer Res.* 2021; 27(14):3980-9. doi: 10.1158/1078-0432.CCR-20-4135.

## **Selected or ongoing grants/clinical studies**

AZV č. NV19-08-00113: Feasibility study of next-generation sequencing for individualized treatment of patients with solid tumors;

GAČR č. 21-14082S: The role of Notch signaling pathway in the mechanism of action of new taxane derivatives;

INTER-EXCELLENCE č. LTAUSA19: Study of the relationship between structure and function of novel taxane derivatives in combating cancer cell resistance.

## **PhD Students**

Number of current PhD students: 10

Number of defended students with year of defense: 10 (1x 2020, 3x 2017, 2x 2013, 1x 2012, 1x 2011, 1x 2008 a 1x 2004)