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**Metabolomics Study of the Association between Pancreatic Cancer and Diabetes Mellitus.**

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2019

Dostupný z <http://www.nusl.cz/ntk/nusl-394158>

Dílo je chráněno podle autorského zákona č. 121/2000 Sb.

Tento dokument byl stažen z Národního úložiště šedé literatury (NUŠL).

Datum stažení: 18.05.2024

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## O9 - METABOLOMICS STUDY OF THE ASSOCIATION BETWEEN PANCREATIC CANCER AND DIABETES MELLITUS

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Pancreatic cancer (PC) is considered one of five most lethal cancer types, with a globally reported incidence increase.<sup>1</sup> Local symptoms, such as pain, jaundice, cachexia or cholangitis, appear late. Early symptomatology, including weakness, nausea, abdominal pain or unexplained weight loss, is not specific and may have many other causes.<sup>2</sup> Therefore, there is currently no reliable early-stage diagnosis. Unfortunately, the prognosis is highly unfavourable, 95–97% patients would not survive more than 5-years. Consequently, the search for early symptoms and specific biomarkers of PC remains a subject of intense research. A proper biomarker would open the possibility to suggest a screening program for early PC diagnosis, before late symptoms occur.<sup>3</sup> At least 3 groups of patients can benefit from such screening program, namely individuals with specific risk factors, hereditary factors and pancreatogenic type 3 diabetes (T3cDM). These patients can exhibit early PC symptoms 2–3 years before any local symptoms occur, which represents a large diagnostic window.<sup>4</sup>

In our study, <sup>1</sup>H NMR metabolomics was employed to plasma samples of pancreatic cancer patients, individuals with long-term diabetes mellitus type 2 (lasting more than 5 years) and healthy controls. The NMR analyses were followed by establishing a statistical model based on principal component analysis and discriminant analysis. The aim was to discover differences between these groups and to define a potential biomarker panel. The statistical evaluation of metabolomics-based profiles provided high values of sensitivity and specificity. Subsequently, plasma samples of the risk group, specifically patients with recently diagnosed diabetes mellitus with a duration of <3 years (possible T3cDM), were analysed and the possibility of PC development was predicted. The achieved results showed strong potential of <sup>1</sup>H NMR metabolomics to establish a biomarker panel that would facilitate the early diagnosis of PC and the possibility to identify diabetic individuals, who are at risk of developing PC.

### References

1. Siegel, R. L.; Miller, K. D.; Jemal, A., *Ca-Cancer J. Clin.* **2019**, *69* (1), 7-34.
2. Verma, M., *Cancers* **2010**, *2* (4), 1830-1837.
3. Poruk, K. E.; Firpo, M. A.; Adler, D. G.; Mulvihill, S. J., *Ann. Surg.* **2013**, *257* (1), 17-26.
4. Pannala, R.; Basu, A.; Petersen, G. M.; Chari, S. T., *Lancet Oncol.* **2009**, *10* (1), 88-95.

### Acknowledgement

The authors thank Prof. Miroslav Zavoral and Dr. Bohuš Bunganič from the Department of Gastrointestinal Endoscopy at the Internal Clinic of the Military University Hospital and the First Faculty of Medicine (Charles University in Prague, Czech Republic) for providing the plasma samples. The work was realized within grant no. 16-31028A provided by the Ministry of Health of the Czech Republic.