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Biomarkers in ethiology, onset and prognosis of gastrointestinal cancers

According to the NCI definition biomarkers represent biological molecules in blood, other body fluids or tissues that are signs of normal or abnormal process or disease (e.g. cancer). They shall objectively differentiate and evaluate normal biological processes from the pathological ones. Additionally, biomarkers should map pharmacological response to therapeutic intervention. In defining the disease biomarkers may be arbitrarily classified into following, rather clinical, categories: i) biomarkers for diagnosis/screening, ii) biomarkers for evaluation of progression, iii) biomarkers of prediction of response and iv) overall prognosis of the disease. We can also stratify biomarkers into more theoretical groups, comprising biomarkers of genomic landscape of cancer, biomarkers defining functions of substantial biological systems (or whole organism), biomarkers of epigenetic regulations, biomarkers of cancer phenotype, biomarkers of treatment response and biomarkers of immune response. In case of colorectal cancer biomarkers describing the microenvironment are essential. The whole process of biomarker´s development utilization has recently been described by (Taenzer et al. 2013), however, by using biomarkers following preconditions should be born in mind: their sensitivity, validity, reproducibility, availability, informativness, cost effectivness and complexity versus interpretability. Cancer undoubtedly exhibits a complex, multifactorial origin, comprising a plethora of genetic and environmental/life style factors acting in interaction. The scope of selected biomarkers should reflect this complexity. Implementation of proof of principle and logical chain in employed biomarkers is of utmost importance.

Gastrointestinal (GIT) cancers, colorectal and pancreatic cancers in particular, represent serious health problems worldwide, irrespective of the stratification for the developmental status of the particular country. Incidence of GIT malignancies takes four to five places in the top ten cancer locations and the same tendency is reflected in the mortality. Due to these sombre statistics we directed our effort to the investigations of these malignancies and several examples on the use of disease biomarkers will be provided. One of the most prominent aims is a dissection of validated, early and reliable transient biomarker(s) predicting in advance the onset of cancer.

Biography

Pavel Vodicka graduated at the Medical Faculty, Charles University, Prague and in 1986 obtained Ph.D. in biochemistry. He worked as postdoctoral fellow at the Finnish Inst. Occupat. Health, Helsinki, Finland (1987-1990) and as visiting scientist at Karolinska Institute, Huddinge, Sweden (1990-1993). Since 2002 he heads the Dept. Molec. Biol. Cancer, Inst. Exper. Medicine, Acad. Sci., Prague, Czech Republic. Pavel Vodicka has published more than 130 (total IF 552.4, 2650 citations a HI 31) articles. Since 2004, his main research topics are focused on the DNA and chromosomal damage and DNA repair functional tests in humans and on transient biomarkers in the onset of gastrointestinal cancers. In 2012 he edited the Special Issue in Mutagenesis (http://mutage.oxfordjournals.org/content/27/2.toc), entitled Colorectal Cancer-Current Insights into Susceptibility.

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Page 33