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Metabolomics profile in gastrointestinal cancers: Update and future perspectives

 Nannini *et al.* NMR metabolomics in GI cancers

Giulia Nannini, Gaia Meoni, Amedeo Amedei, Leonardo Tenori

Abstract

Despite recent progress in diagnosis and therapy, gastrointestinal (GI) cancers remain one of the most important causes of death with a poor prognosis due to late diagnosis. Serum tumor markers and detection of occult blood in the stool are the current tests used in the clinic of GI cancers; however, these tests are not useful as diagnostic screening since they have low specificity and low sensitivity. Considering that one of the hallmarks of cancer is dysregulated metabolism and metabolomics is an optimal approach to illustrate the metabolic mechanisms that belong to living systems, is now clear that this -omics could open a new way to study cancer. In the last years, nuclear magnetic resonance (NMR) metabolomics has demonstrated to be an optimal approach for diseases' diagnosis

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Studying cancer through metabolomics could reveal new biomarkers for cancer that could be useful for its future prognosis, diagnosis and therapy. Metabolomics is becoming an increasingly popular tool in the life sciences since it is a relatively fast and accurate technique that can be applied with either a particular focus or in a global manner to reveal new knowledge about biological systems.

Cited by: 232 Author: Emily G. Armitage, Coral Barbas Publish Year: 2014

Metabolomics in bladder cancer: a systematic review

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4565288>

Bladder cancer (BC) is the most common urological malignancy. Early diagnosis of BC is crucial to improve patient outcomes. Currently, metabolomics is a potential technique that can be used to detect BC. We reviewed current publications and synthesised the findings on BC and metabolomics, i.e. metabolite upregulation and downregulation.

Cited by: 16 Author: Yidong Cheng, Xiao Yang, Xiaheng Deng, Xi... Publish Year: 2015

Metabolomics and Bladder Cancer: Current State and Future ...

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Regarding to bladder cancer, several metabolites were associated with the presence of bladder cancer, leading to the creation of a metabolomic profile capable of distinguishing between bladder cancer patients and control. Besides the diagnosis, the metabolomic has also been studied to stratify bladder cancer according to its aggressiveness.

Cited by: 1 Author: Hugo Antunes, Edgar Tavares-da-Silva, Inê... Publish Year: 2018

Application of metabolomics in sarcoma: from biomarkers to ...

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5527996>

Characterized metabolomics changes will allow us to update viewpoints of osteosarcoma phenotypes and design new therapies towards tumor cell proliferation and migration. (Table 3) A metabolomics study was designed to characterize the metabolic changes associated with tumor invasion and metastasis to the lungs in a mouse model with subcutaneous transplantation of murine osteosarcoma ...

Cited by: 3 Author: Li Min, Li Min, Edwin Choy, Chongqi Tu, Fra... Publish Year: 2017

Metabolomics in cancer biomarker discovery: Current trends ...

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Metabolomics in breast cancer: A decade in review ...

<https://www.researchgate.net/publication/324914579...>

Conclusions: In breast cancer a metabolomics signature of cancer exists and can be detected in patient plasma irrespectively of the breast cancer type.

Study of the Serum Metabolomic Profile in Nonalcoholic ...

<https://www.mdpi.com/2218-1989/8/1/17/htm>

Another main future perspective concerns the possible prevention of hepatocellular carcinoma (HCC) onset. Although this is not the principal aim of the present review, we would like to cite the study by Teilhet et al. . They performed a comparative metabolomics study between patients with NASH-related cirrhosis and non-cirrhotic NAFLD who underwent hepatectomy for HCC.

Cited by: 6 Author: Stefano Gitto, Filippo Schepis, Pietro Andre... Publish Year: 2018

Future perspectives and nursing issues in gastrointestinal ...

<https://www.sciencedirect.com/science/article/pii/0749208188900824>

Future Perspectives and Nursing Issues in Gastrointestinal Cancer Margaret Hansen Frogge WITH the health care revolution underway and major social program changes in progress, a perspective on the future care of persons with gastrointestinal (GI) cancer encompasses a ...

Author: Margaret Hansen Frogge Publish Year: 1988

Metabolomics in pesticide research and development: review ...

<https://link.springer.com/article/10.1007/s11306-010-0231-x>

Aug 10, 2010 · Abstract. The emerge of metabolomics within functional genomics has provided a new dimension in the study of biological systems. In regards to the study of agroecosystems, metabolomics enables monitoring of metabolic changes in association with biotic or abiotic agents such as agrochemicals. Focusing on crop protection chemicals,...

Cited by: 102 Author: Konstantinos A. Aliferis, Maria Chrysayi-To... Publish Year: 2011

Current and Future Perspectives on the Structural ... - MDPI

<https://www.mdpi.com/2218-1989/6/4/46>

Future perspectives in structure elucidation are also discussed; with a focus on the potential development of instruments and techniques, in both nuclear magnetic resonance spectroscopy and mass spectrometry that, may help solve some of the current issues that are hampering the complete identification of metabolite structure and function.

Cited by: 65 Author: Daniel A. Dias, Oliver A.H. Jones, David J. B... Publish Year: 2016

Advances in Pancreatic Cancer: The Role of Metabolomics ...

<https://pancreas.imedpub.com/advances-in...>

Metabolomics and Pancreatic Cancer Pancreatic adenocarcinoma (PC) is the twelfth most common cancer in North America and Europe, and the fourth cause of cancer related deaths with an overall 5-year survival rate of 5 to 10% [6 - 9].

Recent advances in metabolomics in neurological disease ...

<https://link.springer.com/10.1007/s00216-013-7061-4>

May 30, 2013 · Discovery of clinically relevant biomarkers for diseases has revealed metabolomics has potential advantages that classical diagnostic approaches do not. The great asset of metabolomics is that it enables assessment of global metabolic profiles of biofluids and discovery of biomarkers distinguishing disease status, with the possibility of enhancing clinical diagnostics. Most current ...

[PDF] Future Perspectives of Metabolomics in Adipocytes

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Metabolomics for the masses: The future of metabolomics in ...

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The **future** of **metabolomics** does not stop at personalised medicine itself. For the application of **metabolomics in preventive medicine** as well as screening, the world is your oyster. Indeed, **metabolomics** could play not only a crucial role in monitoring life on the Earth but also beyond [65] .

Cited by: 67

Author: Drupad K. Trivedi, Katherine A. Hollyw...

Publish Year: 2017

Metabolomics and Bladder Cancer: Current State and Future ...

<https://www.actaurologicaportuguesa.com/index.php/aup/article/view/64> ▾

Evidence Acquisition: We searched PubMed, Medline and Web of Science for studies about **metabolomics** and bladder **cancer** published before October 2017. We performed a review of the literature, trying to clarify what is already known about the application of **metabolomics** in bladder **cancer** and what are the **future** prospects.

Cited by: 1

Author: Hugo Antunes, Edgar Tavares-da-Silv...

Publish Year: 2018

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<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4565288>

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Cited by: 16

Author: Yidong Cheng, Xiao Yang, Xiaheng De...

Publish Year: 2015



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[Urinary metabolites as noninvasive biomarkers of ...](#)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4865713>

May 15, 2016 · Although some overlaps were detected, the **metabolomics profile** of **esophageal cancer** was different than Barrett's esophagus. **Metabolomics studies** in **gastric cancer** are also promising. In a model of **gastric adenocarcinoma-bearing** mice, the urinary levels of TMAO and hippurate were significantly decreased, although the levels of 3-indoxylsulfate, 2-oxoglutarate, and ...

Cited by: 5 **Author:** Irene Sarosiek, Rudolf Schicho, Pedro Bl...

Publish Year: 2016

[Metabolomics in bladder cancer: a systematic review](#)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4565288>

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[Metabolomics for the masses: The future of metabolomics in ...](#)

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Cited by: 67 **Author:** Drupad K. Trivedi, Katherine A. Hollywoo...

Publish Year: 2017

[Current and future perspectives of functional metabolomics ...](#)

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3. Typical applications of **functional metabolomics** 3.1. **Cancers**. **Cancer cells** prefer glucose and glutamine consumption. In 1924, the discovering of Warburg effects attracted much attention of scientists for **cancer metabolism studies** [124, 125]. The preferring utilization of aerobic glycolysis than oxidative