NMR Metalobolomics

It has been shown that individual metabolic profiles exist and are stable over periods of many years, insensitive to alterations of lifestyles or mild disease conditions, but sensitive to the onset of major diseases from a very early stage. Examples of successful metabolomics profiling from our laboratory are for the diagnosis of potential celiac disease, the prediction of relapse for breast cancer, the prediction of survival of metastatic colorectal cancer, and the early diagnosis of heart failure. Typical diagnostic accuracies range between 80-90%, which is remarkable considering that they can be obtained in the absence of clinical symptoms, and that they can be obtained from a single NMR profile by comparing it with the databases of a number of different diseases. Diagnostic accuracies improve dramatically if the profile of an individual is compared with earlier profiles of the same individual. These evidences suggest that metabolomics by NMR can become a first-line, population-wide screening method. Metabolomic profiling of body fluids by NMR can be obtained in minutes, has unsurpassed reproducibility, and low costs (a few tens of Euro when done in high-throughput mode).

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He has held seminars in many prestigious universities and research institutions worldwide, and plenary lectures in International Workshops, Symposia and Conferences. He has been awarded the 1989 gold medal "Raffaello Nasini", the 1994 Premio Federchimica "For an Intelligent Future", the 1996 European Medal for Biological Inorganic Chemistry by SBIC, the 2001 GDRM gold medal, and recently the Premio Sapio 2017 and the prestigious Richard R. Ernst Prize in Magnetic Resonance (2018).