

# Editorial



## Hormonally Active Compounds in Food

It is increasingly recognized that most food items not only provide nutrients but also contain biologically active constituents that may exert beneficial or adverse effects in various organs. Health-promoting effects of food constituents are increasingly used to create and market functional food, and numerous efforts are made to avoid or at least minimize toxic constituents. The effects of certain categories of bioactive compounds, *e.g.* vitamins and trace elements, are known to depend on their concentration, and beneficial effects at low doses may change to adverse effects at high doses. A particularly complex class of food constituents are compounds which are able to mimic the effects of sex hormones. Formerly known as important regulators of female and male reproduction, it is no longer disputed today that sex hormones also play important roles in the physiology of numerous other organs, *e.g.* the bone, brain, and vascular system. Moreover, sex hormones are associated with the formation of tumors in their target tissues, *e.g.* the breast, uterus and prostate. The phenomenon that hormone-mimicking compounds, incorporated in the food or from the environment, interfere with hormone-regulated processes in humans and animals, is known as “endocrine disruption”. This has developed into a major toxicological research area and public health issue over the past two decades.

*“A particularly complex class of food constituents are compounds which are able to mimic the effects of sex hormones.”*

Hormonally active compounds found in food items comprise both endogenous substances, *e.g.* phytoestrogens, and contaminants, *e.g.* estrogenic mycotoxins and man-made chemicals, such as phthalates and bisphenol A. The members of this group of bioactive food constituents exhibit different chemical structures, affect diverse organs and act through different molecular mechanisms. The articles published in this Special Issue reflect the chemical, biological and mechanistic diversity of hormonally active compounds as well as the broad range of methods utilized to study the various aspects. The majority of papers, found in the first section of the journal, deals with the “oldest” class of phytoestrogens, *i.e.* isoflavones, whereas the other papers focus on lignans, resorcylic acid lactones, and the more recent chalcones, anthocyanidins and phytosterols. Man-made chemicals, *e.g.* phthalates and synthetic estrogens, are addressed at the end of the journal. Aspects of bioavailability and of bacterial and mammalian metabolism are touched upon. The papers on biological activities and on mechanisms address both beneficial, *e.g.* reduction of breast cancer

and improvement of bone tissue, as well as adverse effects, *e.g.* on the female reproductive tract and on body weight after perinatal exposure.

By illuminating the diversity of the chemistry and biology of hormonally active compounds, and by mixing reviews and research papers, we hope

that the articles in this Special Issue will serve as a useful and inspiring source of information.

This Special Issue is dedicated to my former advisor and colleague, Professor Hans-Günter Neumann, who stimulated my interest in hormonally active xenobiotic compounds, their metabolism and their biological sequelae more than thirty years ago.

A handwritten signature in dark ink, appearing to read 'Manfred Metzler'.

Manfred Metzler  
University Karlsruhe