

Fluorine and Health presents a critical multidisciplinary overview on the contribution of fluorinated compounds to resolve the important global issue of medicinal monitoring and health care. The subjects are organized in three thematic parts devoted to Molecular Imaging, Biomedical Materials and Pharmaceuticals.

The molecular imaging chapters review the key-position of partially fluorinated low molecular weight compounds labelled either with the natural ^{19}F -isotope for Magnetic Resonance Imaging (MRI) or with the radioactive [^{18}F]-isotope for Positron Emission Tomography (PET). Both non-invasive methods belong to the most challenging *in vivo* imaging techniques in oncology, neurology and in cardiology for the diagnosis of diseases having the highest mortality in the industrialized countries.

Fluorinated biomaterials range from inorganic ceramics to perfluorinated organic molecules. Liquid perfluorocarbons are used for oxygen transport and as potential respiratory gas carriers, while fluorinated polymers are connected to the pathology of blood vessels. Another important issue is the application of highly fluorinated liquids in ophthalmology. Moreover, fluorine is an essential trace element in bone mineral, dentine and tooth enamel and is used for the prophylaxis and treatment of dental caries. The various origins of human exposure to fluoride species is reviewed to promote a better understanding of the effect of fluoride species on living organisms.

Medicinally relevant fluorinated molecules and their interactions with native proteins are the main focus of the third part. New molecules fluorinated in strategic positions are crucial for the development of pharmaceuticals with desired action and optimal pharmacological profile. Among the hundreds of marketed active drug components there are more than 150 fluorinated compounds. The chapters illustrate how the presence of fluorine atoms modify properties of bioactive compounds at various biochemical steps, and possibly facilitates their emergence as pharmaceuticals. Finally the synthetic potential of a fluorinase, the first C-F bond forming enzyme, is reviewed.

Besides the broad audience of chemists, material scientists, pharmacists and medical doctors, readers interested in this volume would include fluorine chemists, radiochemists, medicinal chemists, biochemists, microbiologists, environmentalists, mineralogists, radiologists, oncologists, neurologists, cardiologists, dentists, and ophthalmologists.



ISBN 978-0-444-53086-8

