

Title

The effect of interaction of heptadecafluorooctanesulfonic acid solution with β -lactoglobulin (LG), hemoglobin (Hb) and myoglobin (Mb): Influence on protein structure and function stability

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Abstract

Heptadecafluorooctanesulfonic acid ($C_8F_{17}KO_3S$) is also known as Perfluorooctanesulfonic acid (PFOS). PFOS is a group of perfluoroalkyl sulfonic acids, which is among the most prominent xenobiotics contaminants in human tissues. The study aims at understanding the effects of $C_8F_{17}KO_3S$ on the structural conformation, stability, and physiological functions of β -Lactoglobulin (LG), hemoglobin (Hb) and Myoglobin (Mb) and the implications in relation to disease emergence. The study is focused on using UV-vis, and fluorescence spectroscopic methods, circular dichroism (CD), and molecular modeling to understand how $C_8F_{17}KO_3S$ affects the stability and the conformation of changes in hemoglobin. Currently, preliminary work has been done on the binding of 8-anilinonaphthalene-1-sulfonic acid (ANS) to LG indicated that the secondary structure of LG has been affected. This gave a greenlight to further investigate the binding of $C_8F_{17}KO_3S$ to LG, Hb and Mb, which may reveal significant mechanist explanation for the longer biological half-life of $C_8F_{17}KO_3S$ in human tissues. Through this study, useful information associated with the toxicity of $C_8F_{17}KO_3S$ will be revealed. Studying the effects of $C_8F_{17}KO_3S$ binding to LG, Hb and Mb could provide insight into emergence of many diseases and putative approaches to be employed to solve these challenges concerning human health. The binding of $C_8F_{17}KO_3S$ to these proteins could alter the structure, physicochemical, and functional properties of these proteins, resulting in complex medical conditions. Hence, it is important to understand the effects of $C_8F_{17}KO_3S$, so that proper preventive and corrective measures can be developed.