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**Structure/function studies of vanadium iodoperoxidase from the bacterium *Zobellia galactanivorans***

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In marine organisms, vanadium dependent haloperoxidases (vHPO) are involved in the production of halo-metabolites and classified in three groups (chloro-, bromo- and iodoperoxidase) according to the most electronegative halide that they oxidize. Whereas vHPO have highly analogue active sites, the molecular bases of their halide specificity are still unknown. In the team, we have solved the first structure of a vHPO specific to iodide, identified from the marine bacterium *Zobellia galactanivorans* (ZgIPO). Through a directed mutagenesis approach, residues in the active site have been targeted to modify the halide specificity of ZgIPO. The results of biochemical and steady-state analysis of the recombinant mutant enzymes are compared to those obtained with the wild type enzyme. In parallel, the electronic environment of the vanadium was determined by X-ray absorption spectroscopy for the native and reactive intermediate forms of ZgIPO and show modification in the coordination sphere of the V compared to other vHPO. These biochemical and structural studies will contribute to the understanding of the mechanisms of halide specificity in vHPO.