

Bioaccumulation of heavy metals in *Parablennius sanguinolentus* and related biomarkers of exposure.

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In the last years, water contamination has been evaluated using fishes as bioindicators. In environmental biomonitoring the main approach to assess marine ecosystem status, is the analysis of pollutants concentration in fish tissues and the utilization of exposure biomarkers. The aim of the present study, is to analyze the level of contaminants, such as Cadmium (Cd), Mercury (Hg), Lead (Pb), Arsenic (As) and the expression of their exposure biomarkers, on gills and muscle tissues of *Parablennius sanguinolentus*, which has been recognized as a useful bioindicator of environmental pollution. In particular, 30 samples of *P. sanguinolentus* were collected from the east coasts of Sicily and analyzed by histological examination. Biomarkers of metal exposure, such as metallothioneins (MTs) of low molecular weight and Heat Shock Proteins 70 (HSP70), were detected using Western Blotting assay and immunohistochemical techniques. Moreover, Inductively coupled-plasma mass-spectrometry (ICP-MS) analysis has been performed in order to quantify metal concentration. Gill and muscle epithelium sections, showed a strong HSPs70 immunopositivity. A clear positive response to MTs has been observed only in gill chloride cells. Moreover, the positivity to MTs and HSPs70, was confirmed by Western Blotting analysis. ICP-MS analysis showed an increase of the mean concentrations of As (14,103mg/Kg), Pb (0,145mg/Kg), Hg (0,035mg/Kg) and Cd (0,014mg/Kg). Histological examination showed no morpho-functional alterations on gills and muscle tissues. The detected concentrations of Pb, Cd and Hg are in accordance to the values established by Commission Regulation (EC) No 1881/2006, that sets maximum levels for certain contaminants in foodstuffs. However, Arsenic levels are significantly higher than those reported in literature. For Arsenic no maximum concentration is yet established by European Union. The diet is the main source of human exposure to Arsenic and therefore is extremely important to focus on wider studies based on heavy metals pollution and Arsenic in particular.

**Keywords:** heavy metals, metallothioneins, HSP70 Heat-Shock Proteins, western blot, Immunohistochemistry, ICP-MS

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