




Abstract

Toxic and Essential Metals in *Stenella coeruleoalba*: Assessment of Marine Environmental Pollution and Dolphin Health Status [†]

Clara Naccari ^{1,*} , Vincenzo Ferrantelli ², Roberto Bava ¹  and Ernesto Palma ¹ 

¹ Department of Health Sciences, University “Magna Graecia” of Catanzaro, 88100 Catanzaro, Italy; roberto.bava@unicz.it (R.B.); palma@unicz.it (E.P.)

² Istituto Zooprofilattico Sperimentale della Sicilia “A. Mirri”, 90129 Palermo, Italy; vincenzo.ferrantelli@izssicilia.it

* Correspondence: c.naccari@unicz.it

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1. Introduction

Heavy metals are environmental contaminants and can easily accumulate and biomagnify in various species (fishes and mammals) at the top of the aquatic food chain. Among marine mammals, the common dolphin (*Stenella coeruleoalba*) is used as a sentinel species of environmental pollution. The aim of this study was to determine the content of toxic metals in organs of *Stenella coeruleoalba* in comparison with essential elements, and to assess marine environmental pollution and dolphin health status.

2. Materials and Methods

Samples of liver, lung, muscle, and skin of *Stenella coeruleoalba* (n = 18 dolphins) were digested with HNO₃ (70%) and H₂O₂ (30%) and submitted to analysis in ICP-MS for the determination of toxic (Hg, Cd, Pb, and As) and potentially toxic (Cr and Ni) metals and essential micro (Se, Zn, Cu, Fe, and Mn) and macro (Na, Ca, K, and Mg) elements.

3. Results

The results showed the presence of all analyzed metals, with the highest Hg levels in all dolphin samples. The correlation between toxic (Hg, Cd, Pb, and As) and potentially toxic (Cr and Ni) metals and essential micro-elements (Zn, Se, and Cu) was expressed as molar ratios. The ratios were 1 (value considered as a protection index) for ⁶⁶Zn/²⁰¹Hg, ⁸²Se/²⁰¹Hg, and ⁶³Cu/²⁰¹Hg and for ⁶⁶Zn/⁵²Cr, ⁸²Se/⁵²Cr, and ⁶³Cu/⁵²Cr in all organs, showing that toxic metals cannot be detoxified by these essential metals. However, the concentrations of all micro and macroelements were normal and predictive of dolphins' health status.

4. Conclusions

The presence of toxic metals in organs of dolphins is correlated to marine environmental pollution and influenced by their food habits. The content of micro and macro-elements, introduced through diet, informs dolphins' health status, although detoxifying essential metals are unable to carry out protective action against toxic metals, probably due to the deficiency, sequestration, or presence of other pollutants.

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