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Effects of exposure to gadolinium on the development of geographically and phylogenetically distant sea urchins species

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ACCEPTED MANUSCRIPT Effects of exposure to gadolinium on the development of geographically and phylogenetically distant sea urchins species Chiara Martino<sup>a-b</sup>, Rosa Bonaventura<sup>a</sup>, Maria Byrne<sup>c</sup>, Maria Roccheri<sup>b</sup>, and Valeria Matranga<sup>a</sup> <sup>a</sup>Consiglio Nazionale delle Ricerche, Istituto di Biomedicina e Immunologia Molecolare "Alberto Monroy", Via Ugo La Malfa 153, 90146 Palermo, Italy <sup>b</sup>Dipartimento Scienze e Tecnologie Biologiche Chimiche e Farmaceutiche, Università di Palermo, Viale delle Scienze, Ed. 16, 90128, Palermo <sup>c</sup>Department of Anatomy and Histology, F13, University of Sydney, NSW, Australia Corresponding authors: chiara.martino@unipa.it; chiara.martino@ibim.cnr.it; mbyrne@anatomy.usyd.edu.au Keywords: Echinoid; Embryos; Skeletogenesis; Developmental Abnormality; Medical Drugs, Ecotoxicology; Environmental Impact **Abbreviations**: hpf, hours post fertilization; Gd, gadolinium; PMCs, Primary Mesenchyme Cells. Author Contributions. Conceived and designed the experiments: CM, MB, VM. Performed the experiments: CM. Performed statistical analysis: RB. Analyzed the data: CM, RB, MCR, MB, VM. Wrote the paper: CM, VM. Revised the manuscript: RB, MCR, MB. In memory of our great colleague and scientist, Dr. Valeria Matranga. 

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