Evaluation of the toxicity of gold nanoparticles produced by green nanotechnology in Zebrafish (*Danio rerio*)

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Gold nanoparticles (AuNPs) of different sizes and shapes have been extensively studied by researchers and laboratories around the world. Several studies have demonstrated the applicability of gold nanoparticles in the treatment and diagnosis of cancer, in the treatment of chronic inflammation, infections, degenerative diseases and autoimmune diseases [1]. The synthesis of AuNPs generally involves reducing agents which present problems related to toxicity. In order to address this issue, metabolites present in various plant extracts have been exploited for the preparation of different nanoparticles. The methods that use phytochemicals to reduce metal ions provide a green approach to nanotechnology, known as green nanotechnology [2]. Researchers have shown that some phytochemicals, such as mangiferin (MGF) and epigallocatechin-gallate (EGCG), in addition to reducing and stabilizing the gold nanoparticles, are able to functionalize them. These molecules have chemical groups that allow binding to overexpressed receptors on some types of tumor cells [3]. The objective of this study was to evaluate the level of toxicity of the gold nanoparticles, reduced and stabilized with epigallocatechin-gallate (EGCG-AuNPs) in Zebrafish embryos (*Danio rerio*), as an indication of a possible environmental effect. To assess the developmental impact of embryos, organisms were exposed to different dilutions of the EGCG-AuNPs suspension for a 96-hour period according to OECD Protocol 236 (Fish Embryo Acute Toxicity Test-FET). Zebrafish is an established vertebrate model for the study of development, disease and is being increasingly used for both pre-clinical studies and toxicological applications due to a range of favorable traits [4]. EGCG-AuNPs demonstrated toxicity, with organ lethality being less than 33% at all concentrations used. The work provided a contribution on the toxicity of AuNPs synthesized and stabilized with the epigallocatechin-gallate reducing agent and using Zebrafish embryos as an animal.

Acknowledgements: This study was supported by fellowship CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior).

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