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Analysis of toxicogenetic impact of Ala16Val-SOD2 polymorphism on methylmercury toxicity

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Toxicogenomic investigations are important tool to understand the genetic influence on susceptibility to xenobiotic exposition, such as methylmercury (MeHg). Considering the high affinity between Hg compounds and selenium, the investigations are concentrated in the analysis of gene polymorphisms on glutathione-related enzymes. However, MeHg causes extensive oxidative stress and basal variation in the efficiency of other antioxidant enzymes could present some impact on its toxicity. Human beings present a polymorphism in superoxide dismutase manganese gene (Ala16Val SOD2), with three possible genotypes (AA=high; VV=low; AV=intermediary efficient of SOD2 activity). Both homozygous genotypes have been associated with chronic diseases and differential *in vitro* toxicity to xenobiotic factors. For this reason, it was postulated that this polymorphism could influence MeHg toxicity. To test this hypothesis peripheral blood mononuclear cells (PBMCs) obtained from healthy adult carrier´s different SOD2 genotypes were exposed to range MeHg concentration. The *in vitro* analyses were performed in controlled cell culture conditions and in triplicate. The cell viability was analyzed after 24 h exposition by two tests: MTT colorimetric assay and free-medium double-strand DNA concentration (Picogreen dye Kit assay). The VV-PBMCs were more resistant to MeHg exposition presenting 1.3 fold higher concentration to kill 50% of cells (CL50) than AA and AV genotypes (CL50: VV=12.2±6.14, AA=9.4±3.14 and AV=9.0±2.46 μM, p=0.001). In low MeHg concentration (0.3 μM) AA-PBMCs presented elevate free double-strand DNA levels in the culture medium suggesting higher susceptibility than others genotypes (p=0.0001). These results appoint to the toxicogenetic effect of SOD2 efficiency on MeHg exposition.

Biography

Thaís Doeler Algarve obtained a BSc degree in Pharmacy (Federal University of Santa Maria), MSc in Biological Sciences - Biochemistry Toxicology (Federal University of Santa Maria) and is Graduate student second year doctorate course. She is currently conducting collaborative doctoral studies in Japan, Tokyo Metropolitan University. She develops studies in toxicogenetics and nutrigenetics, involving modulation of oxidative stress by toxic agents and functional foods.

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