

Title: HBMMSCs as predictive model in toxicological studies

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Despite the growing interest in nanoparticles (NPs), standardized procedures for the evaluation of their toxicity have not been defined. The risk of human exposure is rapidly increasing, and reliable toxicity test systems are needed. *In vitro* methods are ideal in toxicology research because they can provide reproducible results while preventing the use of animals.
For this reason, the first aim of our studies was to evaluate the use of hBMMSCs as method to estimate *in vivo* starting dose for acute toxicity. The results shown first-time hBMMSCs are suited to this purpose. Along these lines, the second target was to evaluate the acute cytotoxicity of CuO using test based on hBMMSCs, proving NPs are more toxic then microparticles ones, but mechanism was still not clear. Therefore we have used metabolomic studies to investigate the metabolic pathways involved in cell death. Discriminant analysis showed that serine, glyceric acid and succinic acid were upregulated on samples treated with CuO microparticles, while glutamine was the only discriminant metabolite for the samples treated with nanoparticles.
Taken together, these results confirm the important role of ROS formation in NPs treatment while providing the first step towards the understanding of the mechanism of toxicity of CuO nanoparticles and microparticles treated cells.
Therefore, our results shown that hBMMSCs represent a good promise for the development of in vitro human assays and could ultimately replace, improve or overtake current predictive models in toxicology.

Biography

Giacomo Cao, was born in Cagliari on September 22, 1960. He received his Master Degree in Chemical Engineering at the University of Cagliari in February 1986 and his PhD also in Chemical Engineering at the University of Bologna in 1990. He became Assistant Professor in 1990, Associate Professor in 1992 and Full Professor in 2001. He has been "visiting scholar" at the Department of Chemical Engineering, University of Notre Dame, USA in 1988, 1992 and 1993 as well as "research associate" in 1993 at the same University. He has been consulting for CRS4 from July 1998 to July 2015. Since October 2013, he is the Chairman of the Board of Directors and Legal Representative of the Sardinian AeroSpace District (DASS) Scarl. He is serving as Chairman of the Department of Mechanical, Chemical and Materials Engineering at the University of Cagliari since July 2015. He has been included in the list of the Top Italian Scientists since November 2016. He has been coordinating/participating several national and international research project funded by

various Companies, Institutions, and Agencies. He is co-author of 3 books, 2 edited book, 12 patents, more than 200 papers in refereed journals and more than 300 presentations at national and international symposia.

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