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Identifying the mitochondria in nanotechnology for radiation safety in industrial processes and health care delivery in Africa: Nigeria, the journey so far

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Environmental technologies frequently emerge as an offshoot of other technological developments or scientific advances. They can also be further enabled by changes in regulatory approach or stakeholder acceptance. Technologies have all been added to the toolbox of environmental technologies over the past decade.

Nanotechnology is an emerging technology and a strategic area of research that Nigeria together with other African countries wishes to exploit for the benefits of mankind. Owing its biological effects, the use of radiation technique is also growing in several sectors in human life, ranging from industrial to medical.

The main focus of this article is to provide a brief overview of nanotechnology research related to radiation safety in industrial processes and health care delivery in Africa so far, with Nigeria, a case study.

Suggestions for future plans are made not only to improve on the already existing ones, but also to expand nanotechnology in other vital areas for mankind.

Biography

Pascal Tchokossa is a Senior Scientist at the Department of Physics, Obafemi Awolowo University. He is also a nationally Accredited Radiation Safety Adviser and Associate Lecturer at the Obafemi Awolowo University Teaching Hospital Complex, where he trained Physiotherapists and Residents Doctors specializing in Radiology. He has served as Resource Person at several international events sponsored by the International Atomic Energy Agency and others bodies. Currently, he is the World Health Organization Expert in the Republic of Gabon to design a radiation protection program. He is the author for several local and international publications and reviewer of several international journals.

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Ocular pharmacoscintigraphic and aqueous humoral drug availability of ganciclovir-loaded mucoadhesive nanoparticles in rabbits

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The presentation here describes the improved ocular retention and aqueous humoral drug availability of ganciclovir (GCV) when administered via topical instillation of different kind of nanoparticles onto the rabbit eye. GCV was loaded into PLGA nanoparticles, chitosan-coated nanoparticles and chitosan-coated niosomal nanoparticles. All three formulations contained nanoparticles equally round in shape with a mean particle size in the range of 180-200 nm. The ocular corneal retention property was evaluated by gamma scintigraphy, revealing that the clearance was slowest in case of the chitosan-containing formulations. GCV in chitosan-coated PLGA nanoparticles and chitosan-coated niosomal nanoparticles showed approximately 6-fold higher aqueous humor drug availability as compared to a GCV solution and nearly 2.5 fold higher as compared to the chitosan-lacking GCV-PLGA nanoparticles. The results indicate that the use of a mucoadhesive chitosan coating can improve the ocular residence time and aqueous humoral availability of GCV when administered topically in nanoparticles.

1. Particle size distribution of GCV nanoparticles: (A) reference GCV-NPs, (B) chitosan- coated GCV-CSNPs, and (C) chitosan-coated GCV-NDs
2. Aqueous humor concentration-time profile of GCV after topical instillation of GCV- solution, reference GCV-NPs, chitosan-coated GCV-CSNPs and chitosan-coated GCV-NDs onto the rabbit eye.

Biography

Sohail Akhter is currently working as Research Associate at the Department of Pharmaceutics, Utrecht University, The Netherlands. His work has focused on the pharmaceutical development, pharmacokinetic and pharmacodynamic evaluation of antipsychotics polymeric particles for overcoming non-adherence in psychotic disorders. He did his Master's and Ph.D. in Pharmaceutical Sciences (Pharmaceutics) on the development of lipid vesicular and polymeric nanoparticulate system for therapeutic targeting and bioavailability enhancement. During his Ph.D., he was awarded with SRF fellowship of CSIR, DBT and UGC. In addition, he was awarded with travel grants for scientific presentations under young scientist category by DST and ICMR. He is credited with 2 Indian patents. Moreover, he has published 2 book chapters and more than 30 research and review papers in peered reviewed journals of high impacts. He is member of review and the editorial (advisory) board of a variety of scientific journals. He was awarded with 6th CLINAM 2013- Fellowship (from European foundation for Clinical Nanomedicine). His research interests involve rational development of nanoparticulates and vesicular systems for effective therapeutic targeting, cancer nanotechnology, ocular drug delivery, pharmacokinetics and bioanalysis etc.

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