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Recent Advances in Chemical Engineering, Biochemistry and Computational Chemistry

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- Proceedings of the 7th WSEAS International Conference on Computational Chemistry (COMPUCHEM '13)
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ISBN: 978-960-474-342-1

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Published by WSEAS Press
www.wseas.org

All papers of the present volume were peer reviewed by no less that two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.
See also: http://www.worldses.org/review/index.html

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Plenary Lecture 1

Nanoparticles as Targeting Delivery Vehicles for Brain Disease Treatment

Professor Yung-Chih Kuo
Department of Chemical Engineering
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Abstract: Finely controlled formulations of nanoparticulate excipient to carry pharmaceuticals and regimens into the central nervous system (CNS) are emerging challenges to the therapy for diseases and neurological disorders in clinical practice. This speech shows the nanoparticle drug delivery systems for medicinal applications. We will discuss the characteristics of colloidal carriers, including the particle size distribution, particle exterior geometry and interior structure, surface charge density, and targeting molecules on particle surface. These physicochemical and biological properties are the most crucial factors affecting the colloidal behavior in biomedical technology. In addition, the efficacy of various nanocarriers in treating brain pathology will be evaluated. Acute ischemic stroke, brain tumor, Alzheimer's disease, and Parkinson's disease are among the highlighted pathological issues using the nanoparticulate system in the current stage. Moreover, the targeting transport of functionalized nanoparticles across the blood–brain barrier will be addressed. Nano-structured colloids can be promising and competent biomaterials for delivering drugs into the brain and producing curative effects on thorny CNS diseases.

Brief Biography of the Speaker: Dr. Yung-Chih Kuo is a professor at the Department of Chemical Engineering, National Chung Cheng University. His research interests are focused on biomaterials, drug delivery system, tissue engineering, blood–brain barrier, stem cell differentiation, nerve regeneration, cancer therapy, Alzheimer's disease treatment, biophysics, and colloid and interface science. In these fields, he has authored or coauthored over 120 SCI journal papers. He is an honor member of Phi Tau Phi Society, a life member in various academic Societies including American Nano Society, European Atherosclerosis Society, Asia-Pacific Chemical, Biological and Environmental Engineering Society, Asian Federation of Biotechnology, Asian Biotechnology Directory, Taiwanese Society of Biomedical Engineering, Chinese Institute of Engineers, Taiwan Institute of Chemical Engineers, Biochemical Engineering Society of Taiwan, and Taiwan Biomaterials and Controlled Release Society. He won Young Scholar Award in 2003 and Distinguished Research Award in 2011 and 2013. He is also an associate editor of J. Taiwan Inst. Chem. Engrs. (Impact factor 2.110) and an editorial board member in 6 international journals, and has been invited as a manuscript reviewer for over 50 journals (top reviewer of the Journal of Physical Chemistry (American Chemical Society)), an external reviewer for European research proposals, academic awards, research grants, faculty recruitments and promotions, and financial support of hosting international symposiums, and an advisory board committeeman of international conferences and symposiums.