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Feng-Huei Lin

National Health Research Institute, Taiwan

Synthesis and biocompatibility of Diamine biomolecules-functionalized SWCNTs as vectors for Gene Delivery

The development of new and stable gene carrier is of great importance to improve the transfection efficiency and achieve to certain fundamental needs in gene therapy such as therapeutic protein formation, immunogenicity enhancement and apoptosis induction. The stability and applicability of the system that contains single-walled carbon nanotubes (SWCNTs) to combine with plasmid DNA (EGFp-C1) was examined by computer simulation. Raman spectroscopy was used as supporting information to verify the process and phenomenon of complex formation. Two diamine biomolecules, 1,4-diaminobutane and polyoxyethylene bis-amine, were applied in order to load positive charges onto the surface of SWCNTs under physiology condition and also enhance the biocompatibility of SWCNTs. The formation of peptide bond was examined with FTIR spectroscopy to confirm the result of cross linking. Concentration of surface functional groups was examined with TGA, which found that they are at an extremely low concentration but show great influence on the physical property. The binding efficiency of functionalized SWCNTs to EGFp-C1 was analyzed through the binding strength under electrophoresis. Cytotoxicity and cell viability were evaluated with LDH and MTT assay that show a significant

increase in cell viability for SWCNTs-1,4-diaminobutane complex. The inflammatory inducing property were assessed by pro-inflammatory factor IL-6 release by using quantitative sandwich enzyme immunoassay technique.

Speaker Biography

Feng-Huei Lin is expertise in biomaterials, tissue engineering & regenerative. He obtained his BS degree in Department of Earth Sciences, National Cheng Kung University (NCKU), Taiwan, in 1980. In 1983, he joined the Functional Ceramics Lab in Institute of Materials Sciences and Engineering, NCKU, Taiwan. During the PhD training, he was not only to take course in engineering school, but also in medical school; that included biochemistry, cell biology, physiology, pathology, anatomy etc. He was honored as PhD degree with 12 SCI publications in November 1989. He served as standing committee member in many international societies since 1996. and as editor, associate editor and editorial board members in many SCI journals. He has published over 350 SCI papers, joined 9 book chapters, awarded 78 patents and transferred 27 technologies to industry to be product. He is willing to cooperated with different kinds of researchers and scientists; and very happy to help young blood to do the research by sharing the knowledge, experience and lab tools. He is very experience both in academic research and industry to push the research fruits to the commercial product.

e: double@ntu.edu.tw

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