Carcinogenic potential of carbon Nanomaterial’s

Carbon nanotubes (CNTs) are high-aspect ratio nanomaterials that have increasingly been used for a wide variety of industrial and commercial applications owing to their unique properties such as high tensile strength, extreme light weight, and high electrical and thermal conductivity. However, there is a great concern about the potential carcinogenicity of CNTs because of their properties such as bio persistence, needle-like shape and mode of exposure similar to asbestos fibers, which is a known human carcinogen causing lung cancer and mesothelioma. Our group has been investigating the long-term health effects of CNTs with a focus on lung cancer and mesothelioma. There is evidence that CNTs can gain access to the nucleus and cause genetic aberrations. Recent studies have shown that CNTs can induce or promote tumor formation in animals, suggesting their potential carcinogenicity in humans. Studies by our group indicate that CNTs can induce malignant transformation of human lung epithelial and mesothelium cells after chronic exposure in culture, as demonstrated by anchorage-independent cell growth, loss of contact inhibition, evasion of apoptosis, and increased cell invasion and migration activities, all of which are hallmarks of cancer cells. The transformed cells also induce tumor formation in mice, substantiating the tumorigenicity of CNTs. Furthermore, CNTs induce pulmonary fibrosis, a chronic lung disease that is often associated with particle-induced lung cancer. This talk will focus on the in vitro and in vivo evidence of CNT carcinogenesis and examine the potential underlying mechanisms with the goal of developing mechanism-based risk assessment and early detection strategies.

Biography

Yon Rojanasakul is Robert C Byrd distinguished Professor and Allen lung cancer program leader at West Virginia University Mary Babb Randolph Cancer Center. He is also a guest scientist at the U. S. National Institute for Occupational Safety and Health. He received his PhD in pharmaceutical sciences from University of Wisconsin in 1989 and has since worked as a full-time faculty member at the West Virginia University. His research is in the areas of pulmonary toxicology, nanotechnology and molecular carcinogenesis. He has published over 185 peer-reviewed research articles in reputable journals.