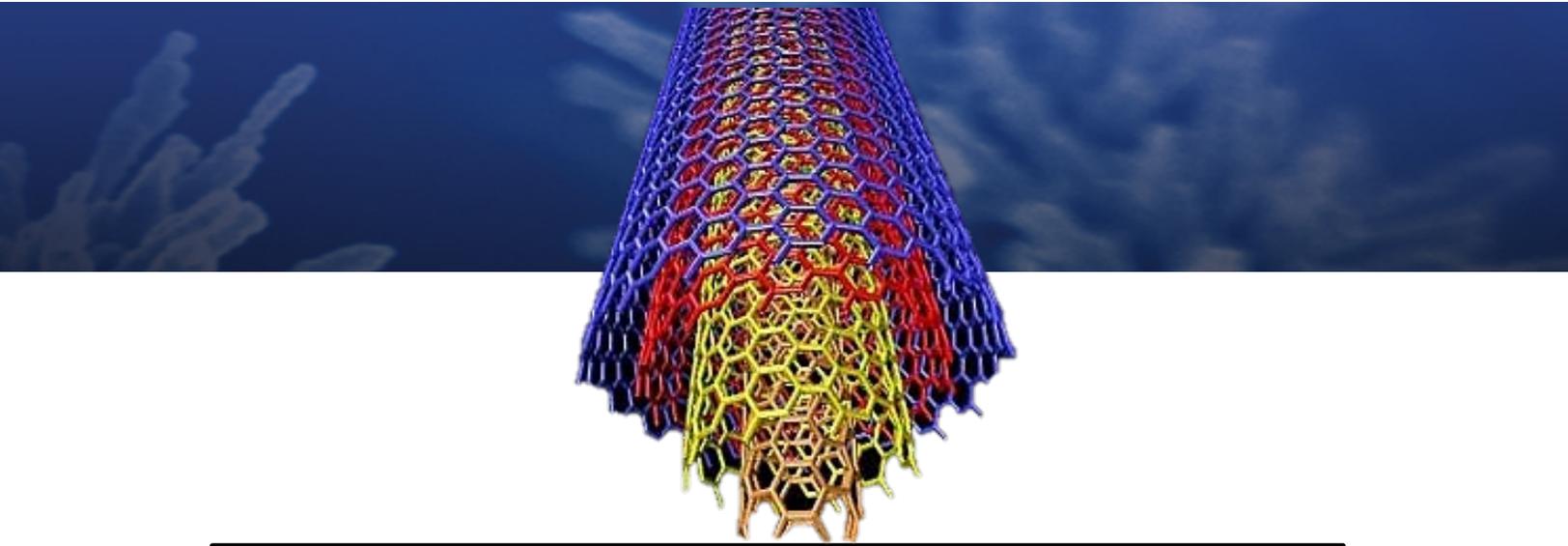


76. Nanocellulose Green Natural Products: Toxicology Prospective

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The development of renewable polymeric materials have received great public attention due to the growing demand for environmental friendly products. Nanocellulose, a unique and promising natural material, has gained interest for its broad use as a reinforcement in the manufacturing of high performance polymer composites, building materials, cosmetics, food, and drug industry. Because of its remarkable physical features, special surface chemistry and excellent biological properties (e.g. biocompatibility, biodegradability and perception of low toxicity), CNC products have already hit the market. Cellulose nanocrystals (CNC) is a crystalline form of cellulose obtained from different sources including wood pulp. High aspect ratio and stiffness of CNC may cause similar pulmonary toxicity as carbon nanotubes and asbestos, thus posing a negative impact on public health and the environment. The present study was undertaken to investigate the pulmonary outcomes induced by exposure to respirable CNC. Pulmonary inflammation/damage, accelerated oxidative stress, impaired pulmonary functions, cytogenic alterations seen by frequency of micro-nucleated cells in BAL fluids, and increase of TGF- β and collagen in the lungs was discovered after exposure to CNC. Notably, these effects were significantly more pronounced in female mice compared to male. Moreover, gender differences in responses to pulmonary exposure to CNC were also detected at the level of global RNA expression as well as in cytokine/chemokine responses. Overall, our results clearly indicated that exposure to respirable CNC caused sustained pulmonary injury.

Keywords: Green Nanomaterials, Green Nanomaterials, Gender Differences, Cellulose, Pulmonary Exposure, Pulmonary Injury



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