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## NANOSCIENCE COLLOQUIUM

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### Inflammatory reactivity of carbon nanotubes:

#### *Focus on biodegradation*

**Dr. Kunal Bhattacharya**

Karolinska Institutet, Stockholm



Unique electronic, optical and mechanical features of carbon nanotubes (CNTs) along with groundbreaking innovations have made them an indispensable part of modern day technologies. Therefore, deliberate, or, accidental exposure of humans to CNTs during manufacturing, end product consumer use and disposal is of increasing concern.

Uptake and biological interactions of CNTs within the human body can trigger a range of innate immune responses based upon the physico-chemical properties of the nanomaterials. Numerous animal studies have linked exposure of CNTs to the induction of inflammation that might lead to destruction of tissues and compromise the homeostasis of the organism. However, as a double-edged sword, inflammatory cells can also mediate can also lead to peroxidase-dependent reactions causing enzymatic degradation of the CNTs.

Thus, using peroxidases of plant and animal origin have shown complete degradation of CNTs into organic intermediate products and harmless carbon dioxide and water as end products. Inflammatory cells *such as* neutrophils and eosinophils have been found capable of enzymatic degradation of CNTs, with mitigation of the pro-inflammatory and pro-fibrotic effects of CNTs. These findings make CNTs a highly suitable candidate for future advanced technologies, potentially also for medical applications.

**Further reading:**

Bhattacharya, K.; Andón F.T., El-Sayed, R.; Fadeel, B. *Mechanisms of carbon nanotube-induced toxicity: Focus on pulmonary inflammation*, *Advanced Drug Delivery Reviews*, June 7 2013. [Epub ahead of print]

Host: Christelle Prinz (FTF)

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