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Nano carbons cross blood brain barrier with potential to entrap and release Alzheimer drug and other relevant molecules

Water soluble Carbon Nano Onions (wsCNO) (25-50 nm) are used to image the life cycle of *Drosophila melanogaster*. The multi-layered wsCNO may be used in drug delivery. The Blood-Brain Barrier (BBB) regulates brain homeostasis and selectively permits the entry of necessary molecules to pass into the brain through tight junctions and enzymatic carriers. This BBB is the greatest impediment preventing any diagnostic or therapeutic probe in combating neuronal disorders or the growth of a tumor inside the brain. Fluorescent wsCNO may be used as a Trojan horse to carry the drug, the drug on its own is a foreign body, may be impermeable to the brain. We report here the crossing of wsCNO through the BBB in the murine model of CADASIL as well as in GBM induced mice. Donepezil, an inhibitor of acetylcholinesterase, is entrapped by wsCNO in acidic Phosphate Buffer Saline (PBS) demonstrating its function as Trojan horse from which the drug is readily released at pH 7.4. The action of wsCNO as Trojan horse is due to its physiological pH dependent 'open and closed sesame' behavior where the spherical wsCNO opens its shape as flat sheet to engulf the drug and closing it. This lecture will also present that several relevant large molecules like tetraphenylporphyrin or ferromagnetic mixed iron oxide can be entrapped and released similarly using graphene oxide prepared by a simple low cost method in the size range 40-200 nm as drug cargo under similar pH dependent action.

Biography

Sabyasachi Sarkar is presently Honorary Professor Emeritus at IESTS, West Bengal and was Senior Professor and Former Head, Chemistry Department of IIT Kanpur where he served 34 years. His research of 48 years spans in the diversified fields on the modeling of the metalloproteins originated from the chemical Darwinism of the extant life. He has guided over 40 PhD, and more than 150 MSc and MTech students in their research, published more than 200 publications and four US and Indian patents. He is an Alexander von Humboldt Fellow (Germany), INSA Research Fellow (New Delhi), Raja Ramanna Fellow (DST, New Delhi), DAAD Fellow (Germany), and Fellow of the Indian Chemical Society (Kolkata), Fellow of the Indian Academy of Sciences (Bangalore) and Fellow of the Royal Society of Chemistry (UK).

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