Electrochemical production of graphene and of Carbon nanotubes or Graphene hybrids with Iridium Oxide. Coatings and electrodes for the Neural System

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Given the intercalation properties of graphite, electrochemical oxidation may be used to exfóliate graphene layers, that may get stabilized either by surfactant counterions, or by the same species that will generate the hybrid finally. Further reduction could return the graphene state to the original oxidation state, with additional ion intercalation of opposite sign.

The same procedure is useful when trying to develop nanostructured materials to be used as electrodes in biological systems, such as the ones used in Parkinson treatment. Nanostructuring carbon nanotubes or graphene within electroactive materials may prevent the inflammation derived form phagocitosis, and the toxic effects observed often with nanoparticles.

The present work shows new materials and methods based on graphene, carbon nanotubes and iridium phases, and the electrochemical properties and cycling, as well as the optimal biocompatibility found in neural cells media.

References

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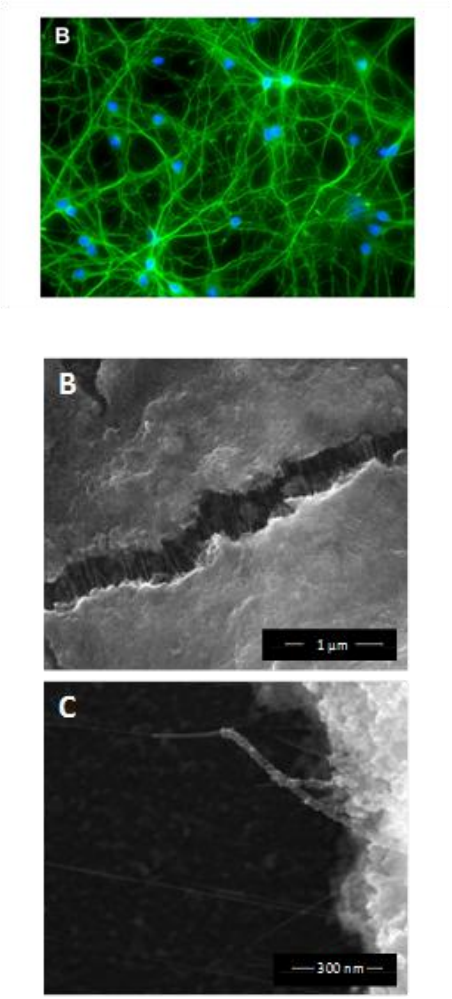

Nanostructuring is clearly observed with nanotubes. IrOx forms around them in layers, while the nanotube supports the oxide structure as a scaffold. The final material es among the most supporting of neural cell growth.