Multiwalled Carbon Nanotubes applied in cancer treatment

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Abstract

Drug resistance is the outcome of chemotherapy promoting the selection of resistant clones of cells within the heterogeneous tumor cell mass [1, 2]. Nanomaterials offer new alternatives to traditional cytotoxic anti-cancer treatments displaying radically different mechanisms to kill cancer cells. Among nanomaterials, multi-walled carbon nanotubes (MWCNTs) can enter inside cells and interfere with the cell´s biomechanics [3], producing cytotoxic effects similar to those of traditional microtubule-binding agents such as taxol®. We have evaluated the cytotoxic properties of serum dispersed MWCNTs on different human cancer cell lines of different origins as well as cells obtained from surgical explants of primary tumors. Our results reveal that MWCNTs have the intrinsic ability to produce anti-proliferative and cytotoxic effects in all these cancer cell models. Understanding and improving the biomimetics of MWCNTs with microtubules could serve to develop new anticancer therapies that can boost traditional chemotherapy, bypassing the drug resistance mechanisms in cancer cells that can be used as broad spectrum cytotoxic nanomedicines against cancer in the nearest future.

References

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