Nanofiber scaffolds demonstrate new features in the behaviour of stem and cancer cells

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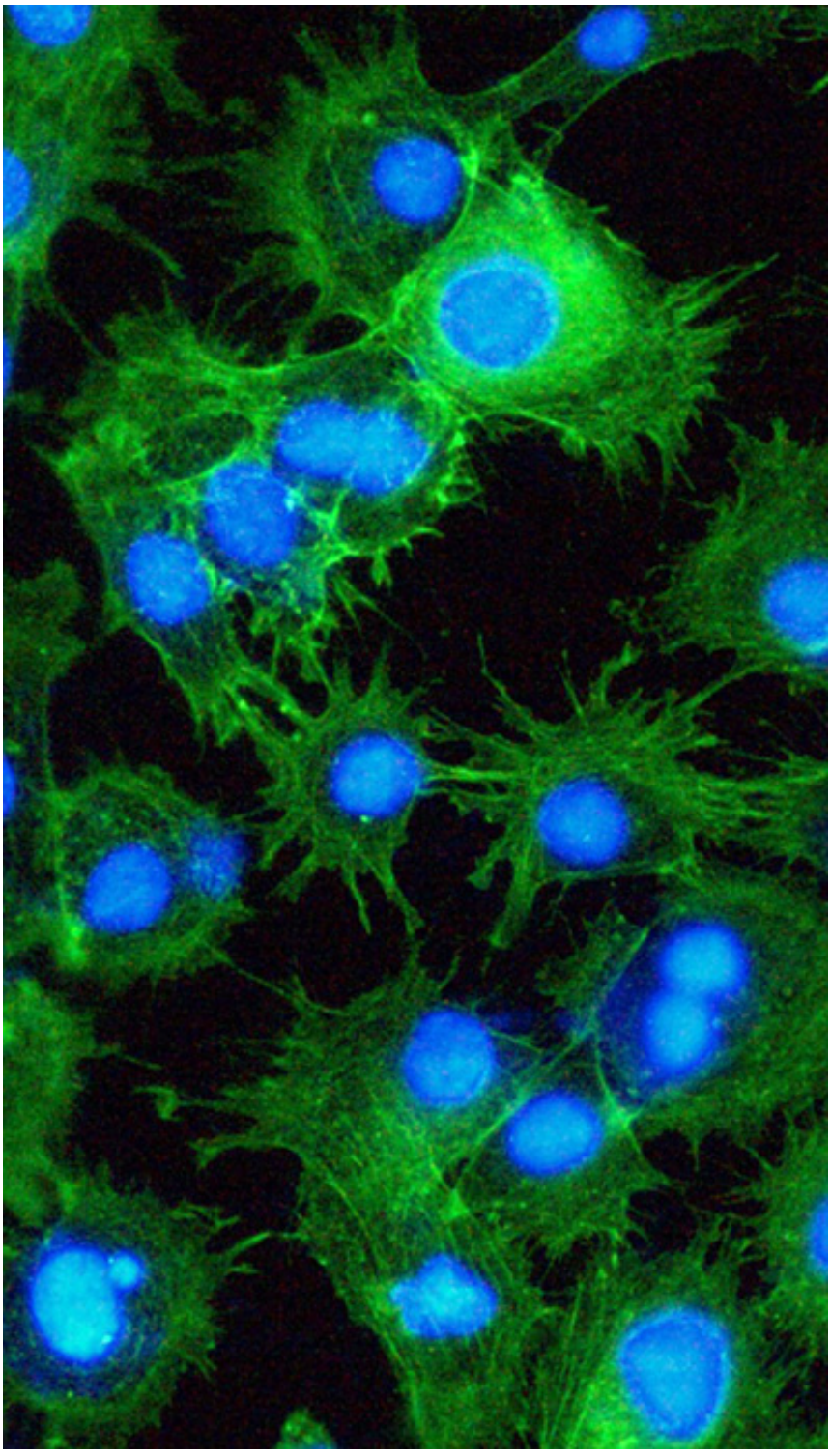

Credit: Aalto University

Novel scaffolds are shown enabling cells to behave in a different but controlled way in vitro due to the presence of aligned, self-assembled ceramic nanofibers of an ultra-high anisotropy ratio augmented into graphene shells.

"This unique hybrid nano-network allows for an exceptional combination of selective guidance stimuli for stem cell development, variations in immune reactions, and behavior of cancer cells", says Professor Michael Gasik from Aalto University.

These scaffolds, for example, were shown to be able to direct the preferential orientation of human mesenchymal stem cells, similarly to neurogenic lineage, to suppress of major inflammatory factors expression and to immobilize cancer cells.

The selective downregulation of specific inflammatory cytokines may be anticipated as a new tool for understanding the human immune system and ways of treating associated diseases. The effects observed are self-regulated by cells only, without the side effects usually arising from the use of external factors.

New scaffolds may help to control the fate of stem cells, such as development towards axons and neurites formation. This is important, for instance, in the development of Alzheimer's disease therapy. The discovery may also be very useful in developing new cancer tumour models, understanding how cancer develops, and developing new cancer therapies.

Fluorescent images of breast carcinoma cell line showing the morphological changes of cells grown on vertical GAIN scaffolds.

More information: Jekaterina Kazantseva et al. Graphene-augmented nanofiber scaffolds demonstrate new features in cells behaviour,

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