

# Nanomaterials and Nanotechnology

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## Graphene - based nanocomposite materials for the development of human organs

Alexander Seifalian

The London Bio Science Innovation Centre, UK

Repair or replacement of many human organs still considers as unmet clinical need, including facial organs, trachea or coronary artery bypass grafts. The key important components in the development of these organs are materials can be used as the scaffold. Commercially there are not many materials to be used for human implantation, this is due to toxicity of material, immunological response or do not have the right physiochemical properties. We have developed a family of nanocomposite materials for biomedical application based on functionalised reduced graphene oxide (FRGO). Graphene considers as a wonder material, it is the strongest material on the planet, super-elastic and conductive. The functionalised GO

is nontoxic and antibacterial. We functionalised GO and used it as a building block for nanocomposite materials. The materials can be fabricated to human organs with the 3D printer or other fabrication methodologies. The scaffold from these materials is functionalised with bioactive molecules and stem cells technology, so physiologically simulate the human organs. The data for development of organs using these materials will be presented. In addition, I present our data on translation work we carried out from laboratory to patients with nanocomposite materials for trachea, facial organs such as ear and nose.

e: a.seifalian@gmail.com