**Dr. Tanveer Tabish**
*Radcliffe Department of Medicine, University of Oxford, UK*
tanveer.tabish@cardiov.ox.ac.uk

Abstract

Nitric oxide (NO) is a key signalling molecule released by vascular endothelial cells that is essential for vascular health. Dysregulation of NO is a common feature in hypertension, angina, heart failure and in the response to vascular injury. For this reason, the exogenous administration of systemic NO donating formulations such as organic nitrates and nitrites have been a cornerstone for the treatment of cardiovascular diseases. These donors primarily produce NO in the circulation, are not targeted to specific vascular beds or cellular sites of action, and have common but debilitating adverse effects. Ideally, it would be possible to deliver the right amount of NO to a precise location at the right time. To achieve these aims, we have recently developed several strategies based on nanomaterials, showing that graphene can either generate NO via the catalytic decomposition of endogenous NO substrates or can store and release therapeutically relevant amounts of NO gas or other NO sources in a controlled manner. For example, we have formulated S-nitroso-cysteamine functionalised graphene as a NO carrier for the prevention of vascular restenosis. This material has desirable properties to dose-dependently promote proliferation in endothelial cells, while inhibiting the growth of smooth muscle cells (SMCs), which was associated with release of cGMP indicating intracellular activation of canonical NO signalling. This talk will present our recent proof-of-principle data on the utility of porous graphene as a NO delivery vehicle to release physiologically relevant amounts of NO *in vitro*, thereby highlighting the potential of these formulations as a strategy for the treatment of cardiovascular diseases.