**POTENTIAL MOLECULAR TARGETS FOR PREVENTION OF PROGRESSION OF ABDOMINAL AORTIC ANEURYSM**

L. Gavish1, R. Beeri2, D. Gilon2, C. Rubinstein2, G. Elberg1, **S.D. Gertz**3

1Faculty of Medicine, The Hebrew University of Jerusalem, Jerusalem, Israel

2Hadassah University Hospital, Jerusalem, Israel

3Faculty of Medicine, The Hebrew University of Jerusalem, Jerusalem, Israel

Although surgical and endovascular interventions prevent rupture of large and rapidly expanding abdominal aortic aneurysms (AAA), no pharmacological regimens or other non-invasive treatments have shown adequate efficacy for retardation of progression of small aneurysms which account for over 80% of all new diagnoses in the human clinical setting. In recent years, a variety of novel mechanism-based cellular and molecular targets have been identified to be associated with key steps in the pathogenesis, expansion, and rupture of AAA. Approaches based on these targets include interference with inflammatory markers on T-cells, inhibition of expression and secretion of pro-inflammatory cytokines e.g. interleukin (IL)-1-beta, and overexpression of transforming growth factor (TGF)-beta-1 by endovascular gene delivery to stabilize the aneursym wall. Other suggested mechanism-based approaches involve inhibition or blockage of various elements and receptors of the renin-angiotensin system, inhibition of various molecular sites related to platelet function and thrombus formation, and modification of the expression of microRNAs that regulate messenger-RNAs involved with synthesis of matrix proteins and matrix metalloproteinases. In this presentation we review these novel molecular targets and their potentially strategic role for early intervention, and present the recent results from our laboratory related to the effect of photobiomodulation (formerly referred to as low level laser therapy) on smooth muscle cell mitochondrial membrane potential and associated molecular pathways responsible for ATP-mediated energy sources necessary for maintenance and repair of arterial wall tissues. Successful translation to the human clinical setting of effective, non-invasive, mechanism-based therapeutic regimens will prevent patients with small aneurysms from reaching the stage of obligatory surgery, endovascular stenting, or, if untreated, rupture and death.

Supported in part by: The Rosetrees Trust Research Fund, UK (M140-F2) and The Stuart Roden/Landsdowne Partners Research Fund, UK.