ImmunoTools *special* Award 2013

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ROLE OF PLANT DERIVED SUBSTANCES IN EXPLORING THE MOLECULAR MECHANISM OF INFLAMMATION IN VASCULAR AGING

Our group is interested to test the hypothesis that vascular aging might be alleviated (decelerated) by curbing inflammation. It is well known that vascular aging is one of the prime culprits for aging of whole organisms. But how to curb vascular aging? The vasculature is lined by a protective layer of endothelial cells. These cells maintain blood vessel homeostasis and health and their dysfunction and premature aging leads to vascular disease. The prime causes for dysfunction and premature aging of endothelial cells are inflammation and oxidative processes – which again lead to inflammation. The resulting phenotypic changes in afflicted endothelial cells attract inflammatory cells and allow them to bind thus maintaining a vicious cycle that drives and keeps endothelial cells in a senescent state. Transcription factor NF-κB has been recognized as master regulator of the described inflammatory processes.

We will test if inhibition of this master regulator can achieve:

- *The delay of senescence resulting from prolonged cell division*
- *The prevention of stress-induced senescence (by oxidation)*

In order to explore this molecular mechanism we will conduct the experiments in vitro by using vascular cells (endothelial, smooth muscle, and fibroblast cells) and inflammatory cells (neutrophils, monocytes , T-cells and macrophages) and will study inflammatory response of these cells to various stimuli such as starvation (serum deprivation), TNF alpha and H_2O_2 and will determine the markers/level of pro inflammatory and inflammatory cytokines, chemokines and antibodies, either mediating the inflammation or being expressed by these cells (like IL-1, IL-2, IL-3, IL-4, IL-5, IL-6, /CD126, IL-7, IL-8, IL-9, IL-10etc, and CD1a, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD9, CD11a, CD11b,CD14, CD15, CD16, CD18, CD19, CD21, CD25, CD29, CD 31, CD36, , CD43, CD45, CD46, Annexin V etc,) Moreover we are interested in their inhibition by using some plant derived substances.

We will also carry out these investigations in vivo by using murine model to explore the similar pro inflammatory/inflammatory markers and antibodies in the blood, cells and tissues of the animal to verify these findings.

The expected results are:

- Proof of concept for the anti-inflammatory approach to delay cellular senescence
- The elucidation of the beneficial potential of readily available plant oil or of its substance of content, for curbing senescence
- the clarification of the “anti-aging” potential of selected plant derived substances with documented anti-inflammatory properties

ImmunoTools box containing antibodies, cytokines and chemokines will be very useful for us to explore the underlying mechanism of this dysfunction and to achieve the above mentioned goals.

ImmunoTools *special* AWARD for **Ezzat M. Awad** includes 25 reagents

FITC - conjugated anti-human CD11a, CD11b, CD29, CD41a, CD61,

PE - conjugated anti-human IL-6,

recombinant human cytokines rh FGF-b / FGF-2, rh G-CSF, rh IFNgamma, rh IL-1alpha / IL-1F1, rh IL-1beta /IL-1F2, rh IL-4, rh IL-6, rh IL-8, rh IL-10, rh IL-11, rh IL-12, rh IL-13, rh IL-15, rh IL-17A, rh IL-20, rh MCP1 / CCL2, rh PDGF-BB, rh RANTES / CCL5,

human IL-6 ELISA-set

DETAILS