Suppression of inflammation during adipogenic differentiation in human preadipocytes

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Introduction: Preadipocytes are present in adipose tissues throughout adult life that can differentiate into mature adipocytes in response to environmental factors. However, little is known about the secretory inflammation-associated cytokines / chemokines during adipogenic differentiation.

Methods: Human preadipocytes-subcutaneous (HPA-s) cells were cultured to 80% confluence. From preadipocytes to mature adipocytes, a total of six induction cycles were performed. Each cycle consisted of two sequential procedures from differentiation medium (for 3 days) to maintenance medium (for 2 days). Maintenance media after each cycle were collected to determine the levels of interleukin (IL)–6, IL-8, monocyte chemoattractant protein 1 (MCP-1), and adiponectin using commercial ELISA kits. Oil red staining was carried out to assess the degree of differentiation.

Results: The levels of pro-inflammatory cytokine IL-6 and chemokine IL-8 but not MCP-1 showed a significant trend of reduction in maintenance medium between each cycle ($P < 0.05$). On the other hand, the level of anti-inflammatory cytokine adiponectin showed a significant trend of elevation between each cycle ($P < 0.05$).

Conclusion: We demonstrated suppression of pro-inflammatory cytokine / chemokine and elevation of anti-inflammatory cytokine as the degree of differentiation increased in preadipocytes, suggesting a close relationship between adipogenic differentiation and inflammation.

The effects of hyperuricaemia on endothelial-dependent and independent vascular function in high cardiovascular risk patients

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Objectives: Hyperuricaemia has been shown to be associated with adverse cardiovascular outcome particularly in high-cardiovascular-risk patients and could be considered as a marker for cardiovascular risk assessment. One of the proposed mechanisms involving hyperuricaemia is the development of vascular damage. The aim of this study was to examine the role of hyperuricaemia on vascular function in patients with high cardiovascular risk.

Methods: We examined the relationship between hyperuricaemia and vasomotor response of the brachial artery by using high-resolution ultrasound in 304 subjects with established coronary artery disease and / or diabetes.

Results: No significant difference was observed in flow-mediated dilatation (FMD), a marker for endothelial-dependent vascular function, between the hyperuricaemic and normouricaemic group ($3.78 \pm 3.0\%$ vs $3.88 \pm 2.9\%$; $P = 0.78$). On the other hand, nitroglycerin-mediated dilatation (NMD), a marker for endothelial-independent vascular function, was significantly lower in the hyperuricaemic group compared with the normouricaemic group ($12.8 \pm 6.9\%$ vs $16.2 \pm 7.7\%$; $P < 0.001$). Multivariate analysis demonstrated that smoking was the strongest predictor of FMD ($b = -0.81$, $P = 0.02$); and that smoking ($b = -2.62$, $P = 0.003$), systolic blood pressure ($b = -0.11$, $P=0.001$), hyperuricaemia ($b = -2.11$, $P=0.02$), and use of nitrates ($b = -3.30$, $P=0.001$) were independent predictors of NMD.

Conclusion: High cardiovascular-risk patients with hyperuricaemia had a lower NMD than those with normouricaemia. Importantly, hyperuricaemia was independently associated with NMD after multivariable adjustments. To further understand the pathophysiological mechanisms involving hyperuricaemia, particularly in the context of impaired NMD, further experimental and clinical studies are needed.