

Evaluation of the atherogenic potential of homocysteine and its cytotoxic effect on HUVECs

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Abstract

Background: In recent decades, several studies have shown that hyperhomocysteinemia is an independent risk factor for atherosclerosis. The objective of this work is, first, to assess the atherogenic potential of homocysteine in rats and to appraise its effect on endothelial cells: the main components of the blood vessel.

Methods: In the *in vivo* study, hyperhomocysteinemia is induced in rats by a diet supplemented with L-methionine (1 g/kg/day). After 21 days of treatment, a blood sample is performed for biochemical study (total cholesterol, triglycerides, HDL, LDL cholesterol, ALT, AST, CRP, and total protein) and a removal of organs (aorta, liver, and heart) for the assay MDA and histological study. For the *in vitro* study, HUVECs were cultured for 24 h then exposed to various concentrations of homocysteine (2 mM, 4 mM, 8 mM). After 24 hours, we confirm the cellular phenotype and its number.

Results: The atherogenic dose of methionine induces a significant increase for all biochemical parameters (except HDL-C, which is diminished). In addition, an alteration of the histological structure of the aorta (appearance of foam cells) of the liver (steatosis) and of the heart. The *in vitro* study revealed a senescent phenotype of HUVECs and an inhibition of cell proliferation.

Conclusion: Our results suggest that homocysteine is involved in the genesis of atherosclerosis by affecting directly the endothelial cells.

Keywords: Homocysteine, Atherosclerosis, Histology, Rat, HUVECs

1. Declaration of conflicts

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2. Authors' biography

No Biography

3. References

No references