

Towards Active Ageing

Exercise Lipoprotein function Adaptation to exercise Oxidative stress

The Effects of Exercise on Lipoprotein Oxidation in Ageing

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The Investigation

Objectives

- To identify changes to lipoprotein oxidation in individuals aged between 65 and 75 following a short session of moderate exercise
- To assess the possible adaptive effects of a moderate programme of physical activity over 8 weeks upon lipoprotein oxidation and nitration

Background

Oxidative damage to cholesterol carriers or lipoproteins, in particular low density lipoprotein, is known to play a role in a number of diseases associated with ageing such as cardiovascular disease, rheumatoid arthritis, diabetes and dementia. Throughout natural ageing our body maintains a balance of oxidative and anti-oxidative species, which can be altered in disease or in other circumstances. Exercise can also alter this balance.

Although it was first assumed that due to an increased oxygen metabolism, exercise would induce an increased release of reactive oxygen and nitrogen species causing damage to proteins, DNA and lipids, more recent research has indicated that exercise induced radical species are key to adaptive processes.

Plan

The aim is to assess individuals between the ages of 65 and 75 years of age. We will assess lipoprotein changes (oxidation and nitration) after an acute exercise session and again after 8 weeks of an exercise programme.

In this way we can identify adaptive processes that may have occurred due to the exercise programme.

Our participants will walk on a treadmill in the laboratory for the acute tests and in groups, 3 times per week for 30 min each session for the exercise programme. Blood samples will be taken before and after each laboratory session and lipoproteins will be isolated and assessed.

Potential Benefits

For older people

Previous pilot research has indicated that young healthy people who undertake regular physical activity can reduce lipoprotein changes which are associated with some disease states.

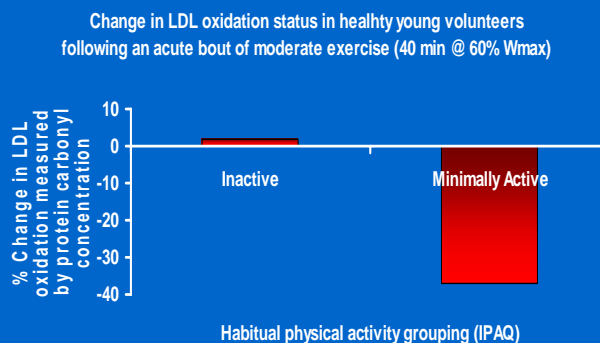
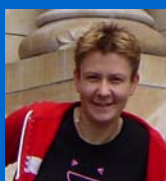


Figure. Lipoprotein changes after exercise in active and inactive young healthy individuals

Lipoproteins are the carriers of cholesterol in our bodies and if damaged by oxidative reactions are known to be involved in cardiovascular disease, rheumatoid arthritis and dementia. Exercise can stimulate adaptations which can reduce potential damage to lipoproteins and thereby reduce the risk of onset of these diseases, often associated with ageing. If the adaptive effects of exercise are also seen in aged individuals, then the results of the proposed research may impact on advice given about the level of physical activity to be undertaken by ageing populations.



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