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## **Seventh Framework Programme for Research and Technological Development Project 1**

### *A study on the effects of the carotenoid Astaxanthin on inflammation and infection in in vitro lung cell models*

The aim of this study is to analyse the effect of extracted carotenoid, astaxanthin, from local sources and the potential role it can play in inflammation and infection in acute and chronic lung disease. Currently, the cost of care and treatment of acute and chronic lung disease is staggering worldwide therefore new mechanisms of intervention are required to improve the efficacy of therapies in patients with these lung conditions. Astaxanthin is a red-coloured carotenoid pigment, which is naturally occurring in seaweed and crustaceans. It is an antioxidant and found to have anti-inflammatory properties. The safety, bioavailability and effects of astaxanthin on oxidation stress and inflammation has been assessed in a small number of clinical trials particularly in relation to the pathophysiology of atherosclerotic cardiovascular disease. No adverse effects have been reported and, in fact, reduction in biomarkers of oxidation stress and inflammation with astaxanthin administration has been found. Excessive neutrophil recruitment is a feature of many lung conditions and can result in lung tissue damage. Thus in this research project, the anti-inflammatory properties of naturally extracted astaxanthin will be examined *in vitro* with the use of lung cell models. This will be achieved by stimulating respiratory epithelial cells with lipopolysaccharide (LPS) a well-known pro-inflammatory stimulus. Cells will be incubated with astaxanthin to see if the inflammatory response can be inhibited in response to LPS stimulation. If astaxanthin is shown to be effective in the inhibition of the inflammatory response in these cells it will serve as an exciting starting point for future evaluation of astaxanthin in *in vivo* models of lung inflammation. In addition, the isolation and generation of the natural astaxanthin product from sustainable local marine sources is promising to the economy.

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