Name of research institute or organization:

Centre Hospitalier Universitaire Vaudois

Title of project:

Fetal programming of hypoxic pulmonary hypertension

Project leader and team:

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Project description:

Pulmonary hypertension is a syndrome of diverse etiology and pathogenesis. It is characterized by a persistent increase in pulmonary vascular resistance, potentially leading to right heart failure and death. Despite important advances in the understanding of the mechanisms underlying its pathogenesis, and new therapeutic approaches, the long-term prognosis for patients with pulmonary hypertension remains poor. A better understanding of the factors and underlying mechanisms predisposing to pulmonary hypertension remains an important challenge.

Among the different forms of pulmonary hypertension, the one related to chronic hypoxia is the most frequent one. In line with Barker's concept of a fetal programming of adult diseases, recent observations from our group suggest that in humans, pathologic events during the fetal and/or perinatal period predispose the offspring to pulmonary endothelial dysfunction, and, in turn, to exaggerated hypoxic pulmonary hypertension later in life. However, the underlying mechanisms remain unknown.

During these studies at the high-altitude research laboratory Jungfraujoch, we are planning to confirm and expand these preliminary findings, by studying the pulmonary-artery pressure response to hypoxia in subgroups of adolescent children who had suffered from specific events during their fetal period that may have resulted in fetal programming of pulmonary hypertension. Moreover, we will test for underlying mechanisms that may be involved in the fetal programming of pulmonary hypertension, and predispose these adolescents to exaggerated hypoxic pulmonary vasoconstriction.

This proposal is expected to provide important new insight into the role and underlying mechanisms of the fetal programming of hypoxic pulmonary hypertension. Furthermore, the translation of this new insight to clinical studies in high-altitude dwellers having suffered from pathologic events during their fetal/perinatal period, is expected to provide new tools for the prevention and the treatment of this frequent and potentially lethal cardiovascular disease.
During the month of October 2007, we have studied 50 adolescent children at the research laboratory. The high-altitude studies have been completed without any incident. We are expecting to have the first results during the first semester of 2008.

Key words:

Hypoxia, pulmonary hypertension, fetal programming, endothelial function

Collaborating partners/networks:

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