CMD InnoCARE (Innovation for CArdiovascular, metabolic and REspiratory diseases)

Master 2 Internship proposal (2026-2027)

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Profile(s) linked to the project:
☒ Experimental Biology *(Recherche expérimentale)*
☒ Research and Omics Data Analysis *(Recherche et analyse de données omiques)*
☐ Clinical Research *(Recherche clinique)*

Lab: ITX

Team: team II, group B Lauzier

Name and position of the supervisor: Pr B Lauzier

Email of the supervisor: benjamin.lauzier@univ-nantes.fr

Candidate (if known):

Title of the internship: O-GlcNAc as a key regulator for survival of babies suffering from congenital cardiac defect

Summary of the internship proposal:
Oxygen is the most important element for survival, and man lives with arterial blood saturation >94%. Congenital heart defects are associated with anatomical alterations that lead to impaired blood flow. For example, Tetralogy of Fallot, a congenital heart defect due to altered cardiac morphology, leads to situations where the baby either has an arterial saturation considered normal (saturation >94%), or has a saturation falling to 70%, a saturation value found in populations living at 5300m altitude (expedition 5300). However, these children tolerate the situation for weeks, even months, before surgery. The survival of these children is surprisingly good for values of hypoxemia often considered incompatible with life. The molecular mechanisms essential to their survival under hypoxemic conditions are poorly understood and little studied, but represent a physiological mystery with far-reaching pathophysiological implications in any context of ischemia and tissue reperfusion. We have built up a biocollection of cardiac and blood samples taken during reconstructive cardiac surgery and blood from children living at 5300m altitude. Surprisingly, O-GlcNAc levels in cardiac samples from hypoxic babies were higher than those from normoxic babies. Given that increased O-GlcNAc levels are beneficial in acute hypoxic situations such as septic shock, and that O-GlcNAc plays an essential role in cell survival, this project aims to test the potential link between the remarkable survival of cyanogen patients and their elevated O-GlcNAc levels.