Cartilage progenitor cells for growth plate regeneration

PROJECT DETAILS

Funding Programme: Horizon 2020
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Funding Scheme: Global Fellowships

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CORDIS link: https://cordis.europa.eu/project/id/843717

PROJECT DESCRIPTION

General Goal

Growth plate (GP) is a cartilage organ located near the ends of the skeletal elements and responsible for longitudinal bone growth. Controlled bone growth is achieved by spatial and temporal regulation of cell proliferation, chondrocyte maturation and hypertrophy of the GP, therefore any injury or dysregulation of this organ will be translated in a skeletal defect. GP is comprised of three cell layers: the resting zone (RZ), the proliferating zone (PZ) and the hypertrophic zone (HZ). One endogenous source of cartilage progenitor cells is thought to be in the RZ, this cells participate in production of hyaline cartilage, allowing for successful cartilage regeneration. However until now, the lack of specific marker(s) for the resting zone restricted the examination of this population in detail. Nevertheless, although the three layers of chondrocytes participate in the process of growing and bone ossification, chondrocyte hypertrophy is the major contributor to bone lengthening, and it determines 3/4 of bone growth not only for syndromes as X-Linked Hypophosphatemia (XLH), but also for other bone and cartilage pathogenesis. Therefore, a better understanding of GP differentiation and development will lead to superior treatments for growth disorders and it would finally support the development of bioengineering strategies for other cartilage diseases. At the present time, the evaluation of the GP can mainly be achieved in vivo, therefore we planned to use different animal models. For that reason in this project we proposed to use genetically modified mice (XLH mice among others), linear tracing strategies as well as Ca/Pi inhibitors. Specifically we aim to 1) gain a better understanding of GP population and its development 2) elucidate whether resting zone cells express skeletal stem cells characteristics 3) look for alternative therapies for growth and other cartilage disorders 4) finally validation of mouse results using human samples.

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GROLARIES

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