

Internship proposition

(One-page max)

Master 2 GP Medicine 4R (Repair, Replace, Regenerate, Reprogram)



Lab: RMeS – UMR1229

Team: REGOS

Name and position of the supervisor: Pierre Guihard (IE)

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Candidate (if internship filled):

Title of the internship:

Summary of the internship proposal: Screening of Angio-/Osteo-genic peptides for bone regenerative medicine

Although autologous bone grafts or tissue engineering are employed as repair strategies for simple, small-volume bone lesions, more complex bone lesions (elderly patients, radiation sequelae or large defects) require restoration of the bone vascular network to achieve clinically satisfactory repair. Consequently, the development of innovative biotherapies targeting both osteogenesis and angiogenesis is essential to achieve complete bone repair.

Bone morphogenetic proteins (BMPs), which possess both angiogenic and osteogenic properties, have been extensively employed in bone regeneration strategies. However, due to their high cost, the potential for the development of resistance, the necessity for supra-physiological doses, and the inability to utilize these growth factors in a tumor context, their utilization remains a delicate and controversial matter.

The MGP (Matrix GLA protein) is a potent and specific inhibitor of BMP-2 and -4. Consequently, preventing the interaction between BMPs and MGP by blocking access to BMP's interaction domain using a peptidic inhibitor could be employed to enhance the endogenous BMP's bioavailability. This would permit the promotion of both osteogenesis and angiogenesis by modulating the natural activity of BMPs, while retaining the beneficial effects of MGP in vivo.

The M2 trainee's objectives will therefore be to participate in the development of screening tools for specific inhibitors, and then to validate them through in vitro tests. The results obtained by the trainee will then enable the functionalization of an injectable bone replacement biomaterial with the identified inhibitors. This innovative therapeutic approach targeting both osteogenesis and angiogenesis is designed to treat patients suffering from delayed bone healing, in the context of an ageing population.

Profile(s) linked to the project:

Experimental Biology (*Recherche expérimentale*)

Clinical Research (*Recherche clinique*)