Designing biocompatible microenvironment for bone regeneration

*Yan Wei, Xuliang Deng**

22# Zhongguancun South Avenue
Haidian District
Peking University School and Hospital of Stomatology
Beijing, China
kqweiyan@bjmu.edu.cn, kqdengxuliang@bjmu.edu.cn

The ability to regenerate damaged tissue is one of the great challenges in the fields of regenerative medicine. Our goal is to study the fundamental science of cell-material interactions and apply this knowledge to the design of biomaterials that translate into clinical solutions. Our research in fundamental science includes elucidating the spatiotemporal behavior rhythm of stem cells in response to chirality [1] and nanotopography [1], and illustrated the molecular mechanism underlying behind mechanotransduction. In the field of nanotechnology, our group develop approaches to control cell behaviour through their inate ability to sense and respond to nanoscale patterns of electricity [2] and mechanical force [3]. These materials though designed for the clinic can be also used as platform systems to study a wide variety of instructive environments for tissue regeneration and cell fate. The molecular-level understanding of regulatory mechanisms and smart materials design would help to advance the regenerative medicine and improve the materials-mediated osteogenesis.

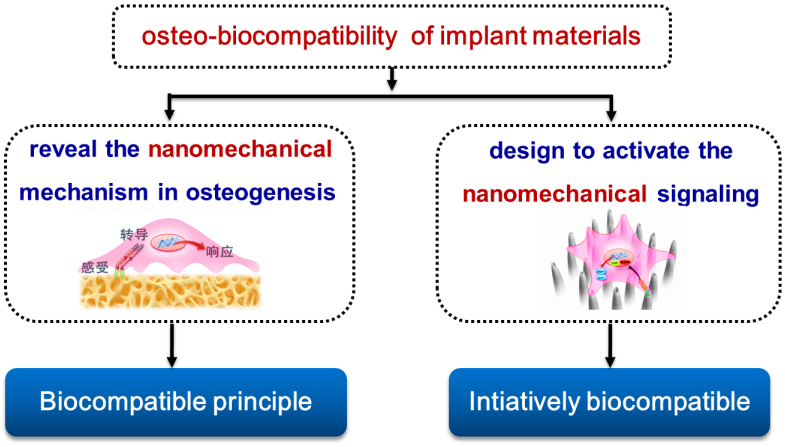

Figure 1: We study the fundamental science of cell-material interactions and apply this knowledge to the design of biomaterials that translate into clinical solutions.

References

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