

Biomimetic approaches for biomedical applications

The research in the field of biomimicry is increasingly popular in research, in technology and in the industry. Lessons learned from Nature enable new discoveries and technological breakthroughs. One can easily understand that biological systems are a tremendously rich source of inspiration because the natural selection have refined them over billions of years of evolution. In our team, we take advantage of the biomimetic approach to synthesize bone substitutes and biomimetic polymer muscles for nanocarriers. The crucial question arises whether the biomechanical properties of these imitations of Nature are relevant to the different biomedical applications. For instance, if a biomimetic or bioinspired bone is produced, if it is intended to serve as a substitute in weight-bearing bones then its properties should be adapted. Hence, we combine synthesis and (bio)mechanical characterization of biomimetic materials for biomedical applications to be sure that their properties are appropriate. The scientific skills required to work on these projects are physico-chemistry, materials chemistry, (bio)chemistry and mechanics.

Subjects

Biomimetic polymer muscles for nanoswimmers

Characterization of bone tissue

Mineralization of bone substitutes

Mentor



Prof. Karim EL KIRAT has an initial background in (bio)chemistry, biophysics and biological physico-chemistry (PhD obtained in 2002). After a post-doctorate training (2002-2005) in nano-characterization and nano-synthesis he joined the Bioengineering and Biomechanics laboratory in 2005. He develops a research in the nano-characterization of living systems (molecules, cells, tissues) and in biomimicry for biomedical applications.

Student profile

Master in biomechanical engineering, or final undergraduate in biomechanical engineering