



Summer Course in Nanoscience and Nanotechnology

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ABSTRACT

Nanoscience and Nanotechnology: Pharmacological nanocarriers

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Nanoscience and nanotechnology are nothing more than the study and application of extremely small materials, less than 100 nm in size. The convergence of two very different areas, such as nanotechnology and medicine, has given rise to an interdisciplinary area called nanomedicine, which includes nanodrugs, diagnostics, theranostics and devices. This new biomedical area is inspiring more specific and effective treatments for complex diseases and uses nanoparticles as drug carriers. They circulate around the body looking for the precise place to deliver the drugs, and we are going to see an example: Our bones can suffer different diseases such as cancer, osteoporosis or infections. Nanomedicine offers a possibility to treat them and in this sense, mesoporous silica nanoparticles (NP's) are potential novel therapeutic agents. It is possible to introduce antitumoral drugs into NP's to kill cancer cells or to load them with biomolecules against osteoporosis or antibiotics for infections. Moreover, in order to control the timing of release, smart nanogates can be used. There is also the possibility to selectively direct them to their target, by chemically modifying their surface. So, by using UV radiation, ultrasounds, heat or magnetic stimuli, you can trigger them and release the drug they are carrying in an exact place and moment. These kind of NP's are versatile, since offer many approaches to treat different diseases in a selective, directed and localized manner.

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