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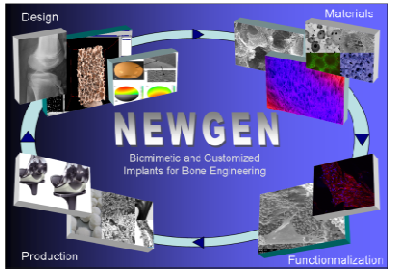
GENERAL PRESENTATION

- ✓ **Complete denomination**: Biomaterials and Encapsulation Laboratory, Department of Life Sciences and Biotechnology, University of Ferrara
- ✓ **Location (city, country)**: Ferrara, Italy
- ✓ **Director**: Prof. Claudio Nastruzzi
- ✓ **Contact person in NEWGEN**: Prof. Claudio Nastruzzi
- ✓ **Working Group involvment**: WG 2 & WG 3
- ✓ **Staff**: Stefania Mazzitelli, Martina Miotto, Stefano Focaroli
- ✓ **Research topics**: Prof. Claudio Nastruzzi
- ✓ **Researchers expertises**: The Biomaterials and Encapsulation Laboratory (BEL) focuses on the development of biomaterials and delivery systems for drugs, biological response modifiers and biotech products. The group design innovative formulations based on liposomes, microspheres, microcapsules, lipospheres emulsions and microemulsions. We offer experties for tissue engineering and cell encapsulation protocols. We performe biocompatibility tests for the validation of biomaterials. The rapid prototyping section focuses on the design and development of small laboratory equipments for biotech applications and microencapsulation protocols.



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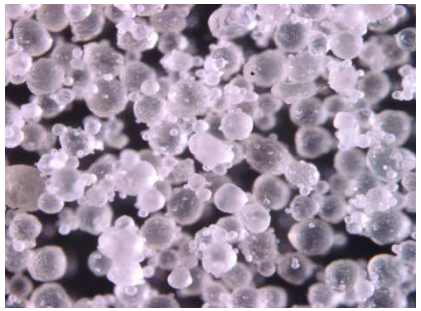
BIOMATERIALS/NEWGEN TOPICS

Drug delivery

The main goal of BEL is an integrative concept of research and teaching in the fields of biomaterials, encapsulation, drug formulation and drug delivery.

Currently are under investigation inorganic matrixes, liposomes, lipospheres, microparticles, nanocapsules, microemulsions and polymeric films. For the development of such delivery systems we are in close cooperation with other groups in the basic, engineering, medical sciences and pharmaceutical industry.



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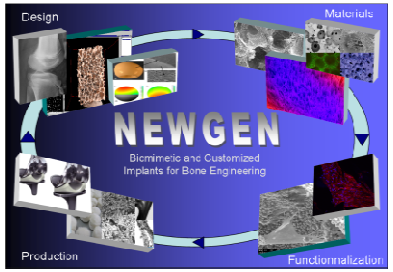

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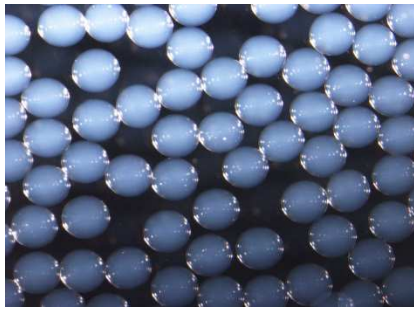
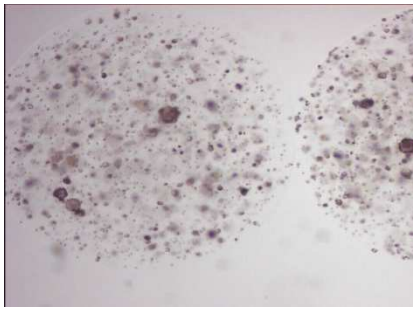
BIOMATERIALS/NEWGEN TOPICS

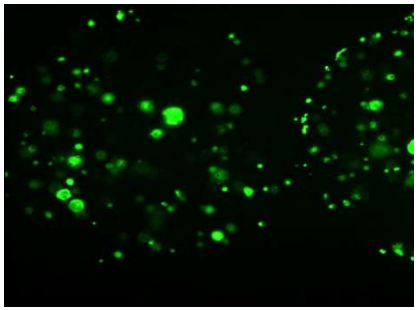
Multifunctional microcapsules for cell entrapment

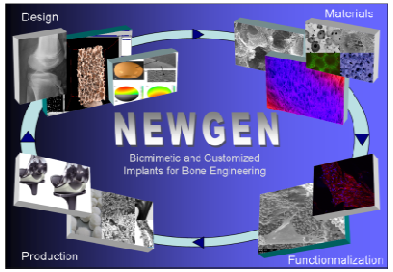
Another important field of study is represented by cell encapsulation and transplantation using natural, synthetic and engineerized polymers.

We introduced a new approach for the integrated immunoprotection of transplanted cells. We designed microcapsules, based on alginate containing multiple compartments that can interact with the encapsulated cell. In this approach, the "cell compartment" benefit from a "chemical/pharmacologic agent compartment" constituted of a sustained release formulation able to deliver the included biological response modifiers for long periods of time.









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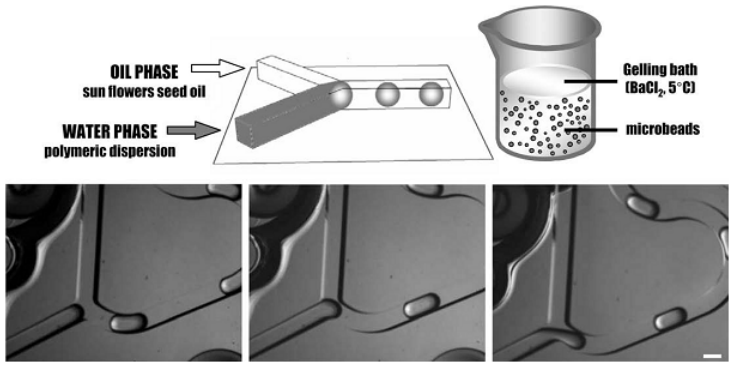
BIOMATERIALS/NEWGEN TOPICS

Lab-on-a-chip approach to biomaterials fabrication

Advanced production strategies for microbead and microfibers production are actively investigated at BEL. Microfluidic devices are conveniently applied as new tools for the formation of multiphasic regimes of flow, later converted in different ways, in highly monodisperse spherical polymeric microparticles or microfibers. Microfluidic procedures allow microparticles or microfibers production at industrial level rates, on the order of 1 kg/day, a rate that is sufficient for commercial production.



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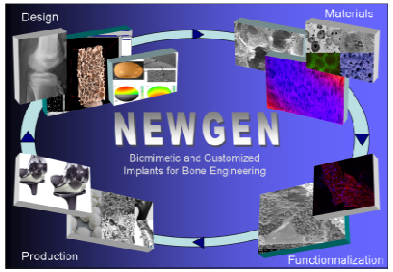

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FACILITIES

BIOMATERIALS ENCAPSULATION LABORATORY

Facilities

Air-driven microencapsulator
Automated vibrational microencapsulator
Spray-drying
Differential Scanning Calorimeter (DSC)
Light-scattering particle size analyzer
Stereo microscope with image analyzer and EDF
H-NMR and C-NMR spectrometers
Mass spettrometer
Ultra Violet spectrophotometer
FT-IR spectrophotometer
HPLC Chromatographer
Gas Chromatographer
Plate rheometer
Freeze-dryer
Microtube extrusors
Homogenizers
Laser granulometer

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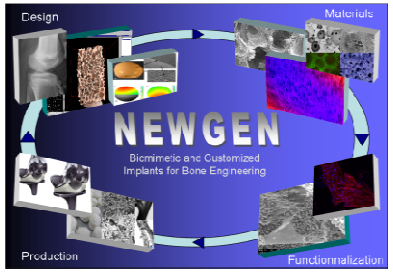

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