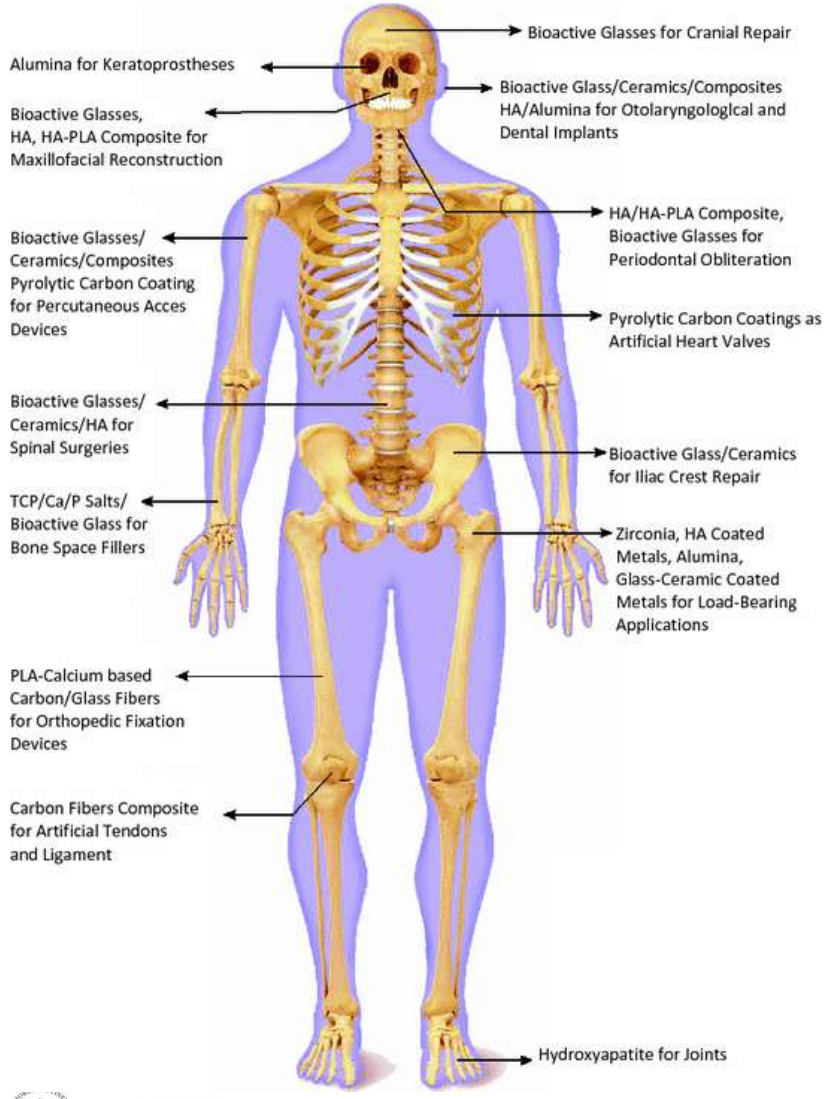

BIOMATERIAL

« a material intended to interface with biological system to evaluate, treat, augment or replace any tissue, organ or function of the body»

(II International consensus conference on biomaterials, Chester – England)

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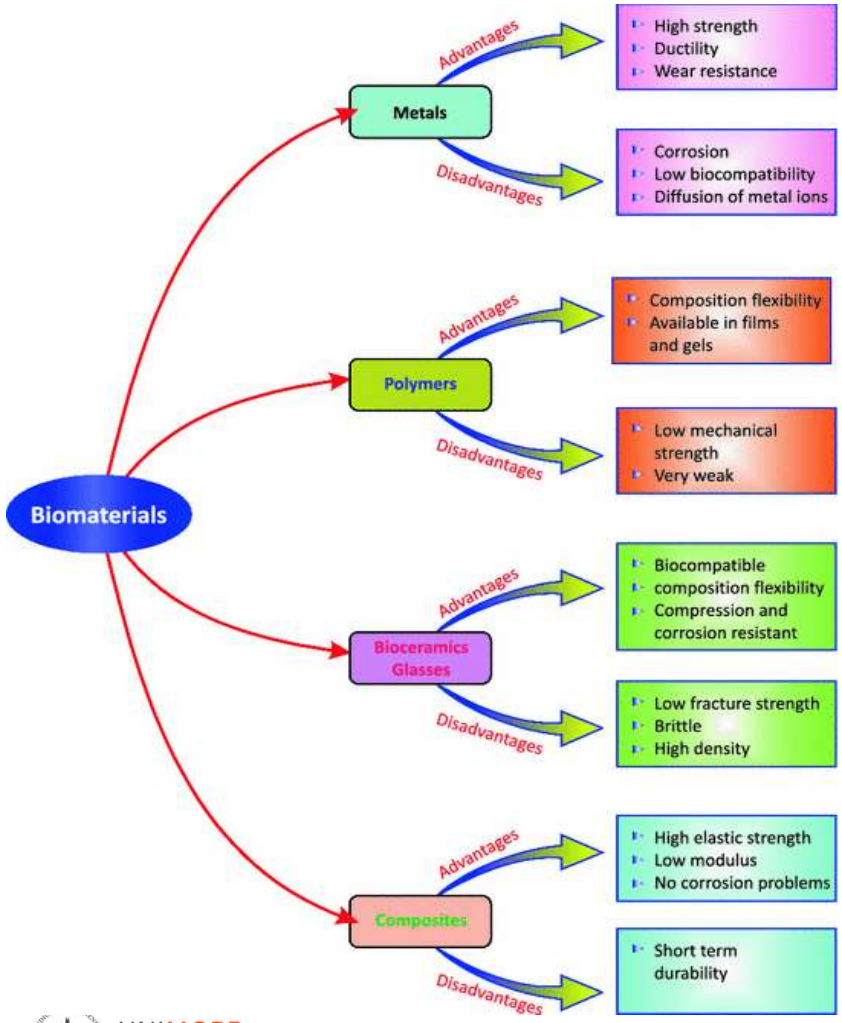
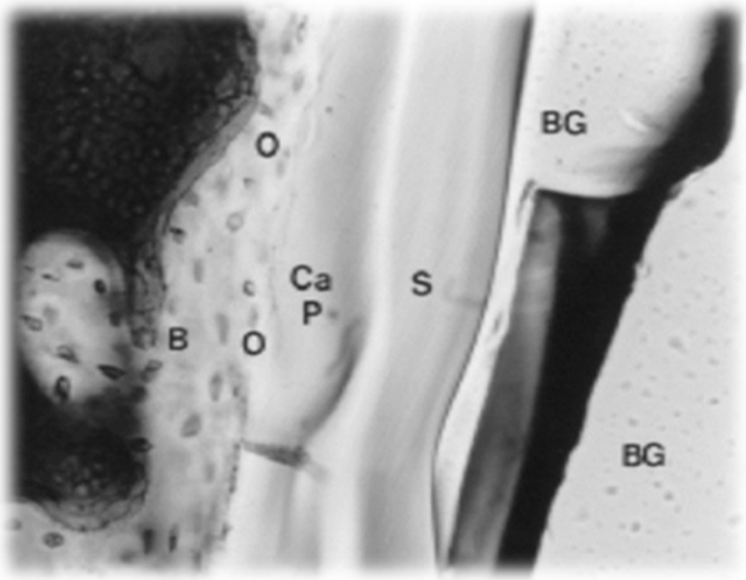
Bioactive glasses



BIOACTIVE GLASSES CONTAINING BIOLOGICALLY IMPORTANT IONS AND MOLECULES

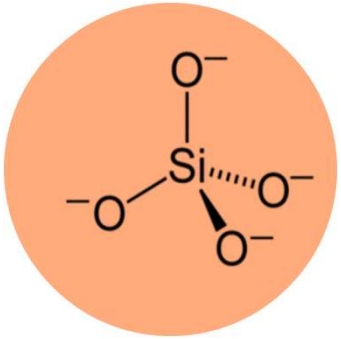


Bioactive glasses exhibit **bioactivity** when in contact with biological fluids, leading to the formation of an **apatitic layer** [$Ca_{10}(PO_4)_6(OH)_2$] responsible for **bonding to living tissue**.

Different bioactive glasses

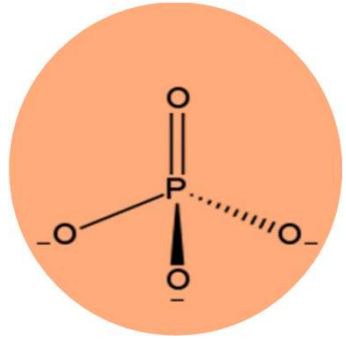
Silicate-based glasses

- Very slow solubility, long-term implants
- Apatite layer formation
- Hard tissue regeneration

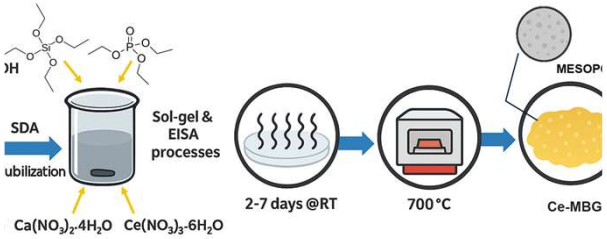


Phosphate-based glasses

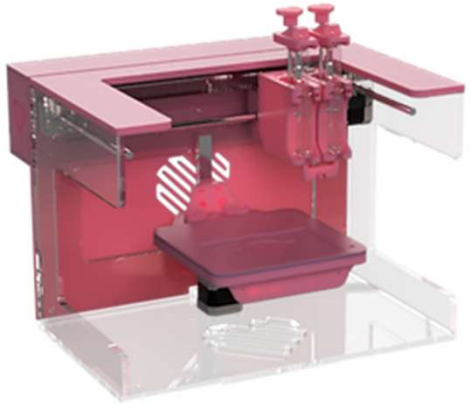
- Bioresorbable, dissolve completely and very fast
- Slow bioactivity
- Soft tissue regeneration



Different synthesis and morphology

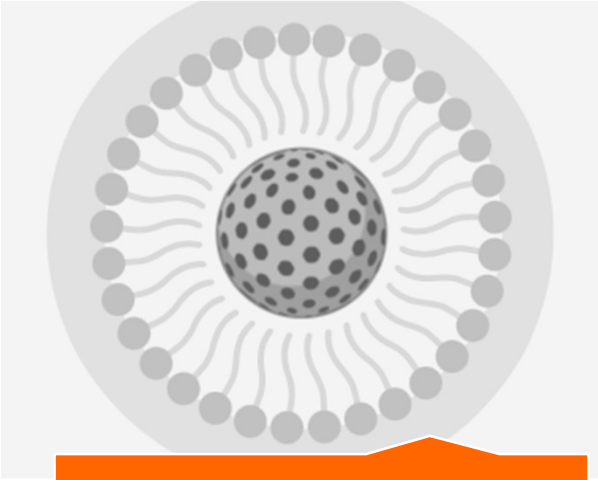


SOL-GEL EISA synthesis

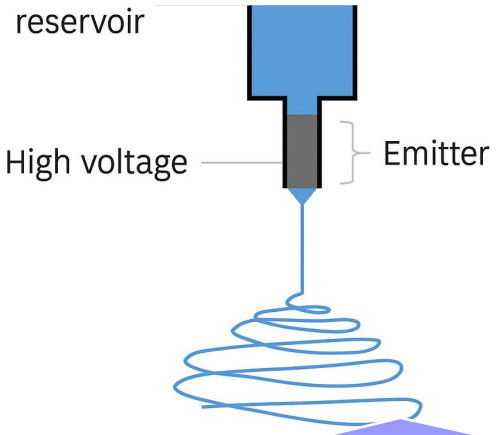


SOL-GEL EISA + 3D bioprinter

SOL-GEL EISA + foam replica method



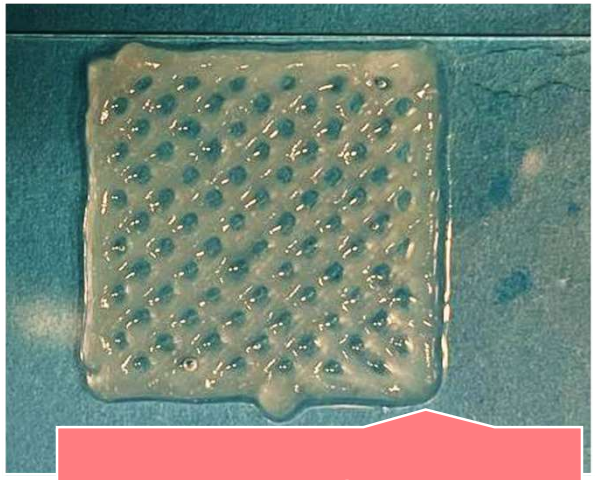
Microemulsion-assisted sol-gel method



COACERVATION synthesis + electrospinning

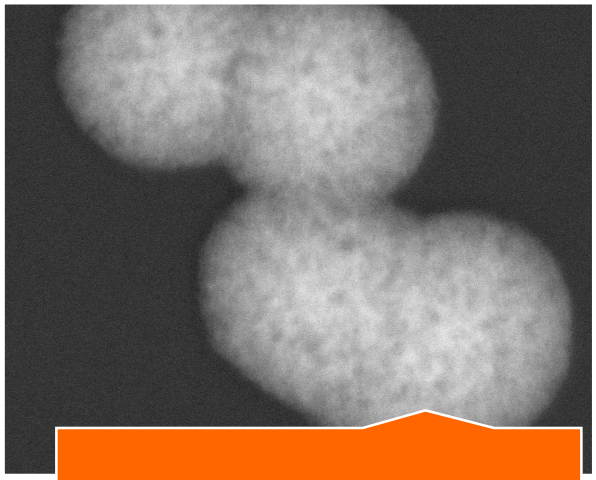
Different synthesis and morphology

Powders

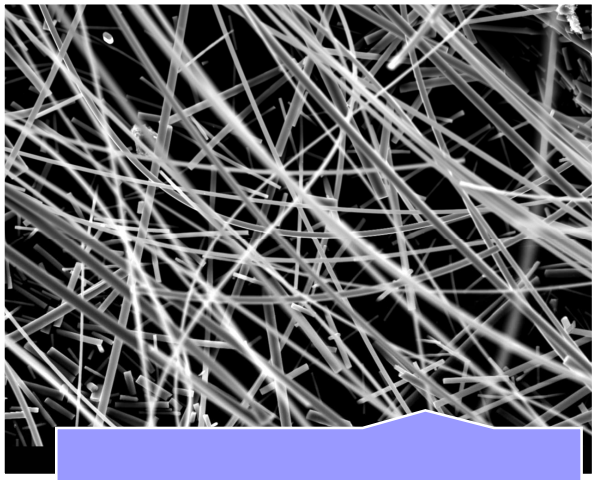


Gels

Scaffold

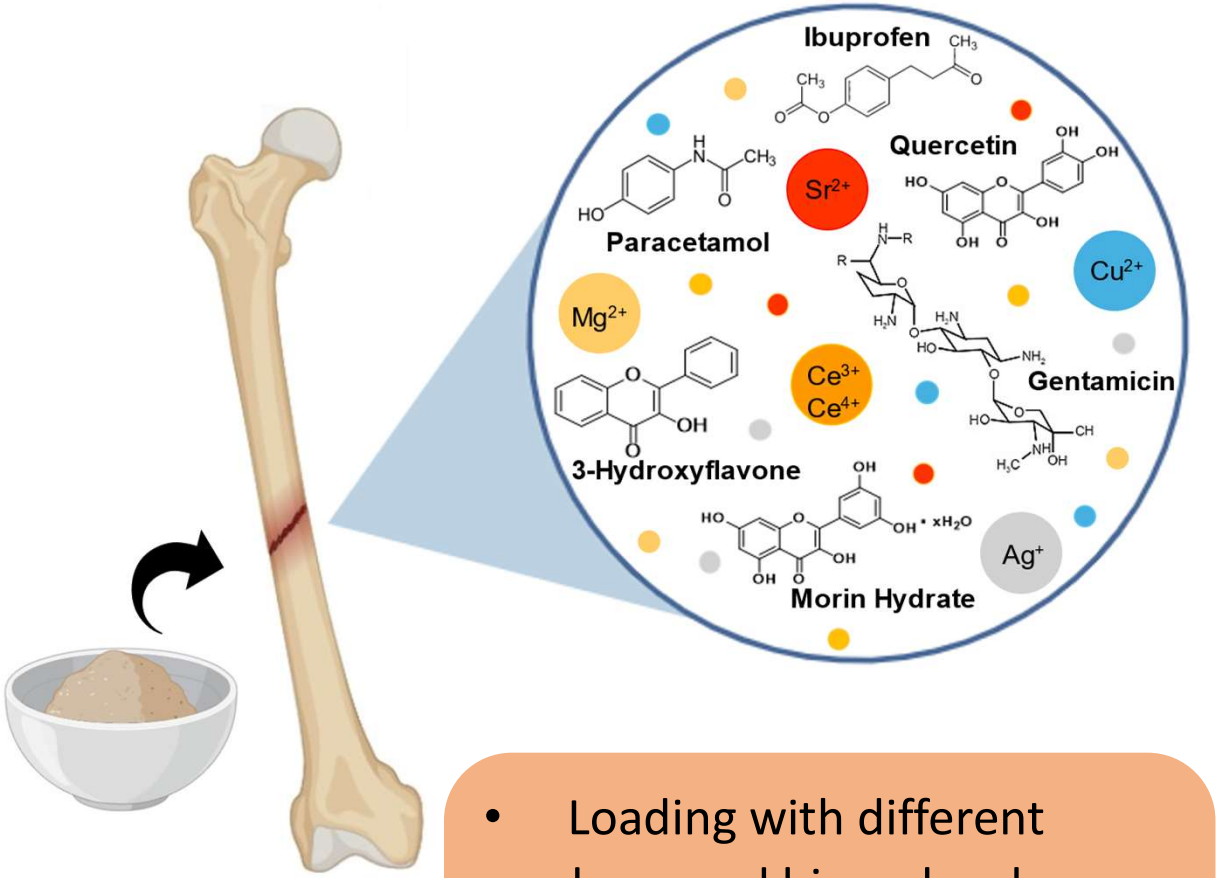


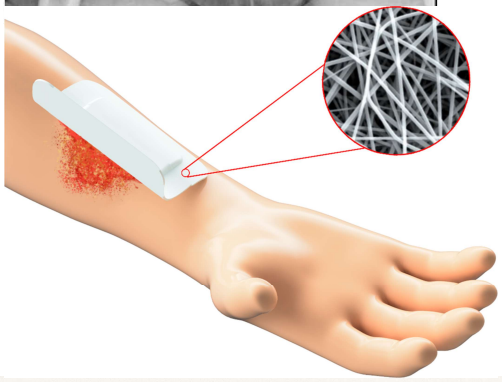
Nanoparticles



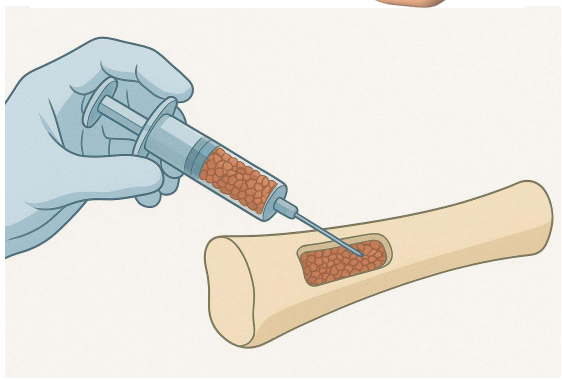
Fibres

DOPING and LOADING





- Loading with different drugs and biomolecules
- Doping with different therapeutic inorganic ions



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OPPORTUNITY

The internship offers the opportunity to perform a variety of experimental tests and gain hands-on experience with several instruments.

Development of different ***drug delivery systems***

Materials for ***hard and soft tissue regeneration***

Characterization: *AE, XRDP, FTIR,UV-Vis, SEM-EDS, TEM, BET, ICP, SOD, CAT*

Antibacterial tests

Cellular assays

In vivo applications

Cytocompatibility of mesoporous bioactive glasses doped with cerium and loaded with polyphenols *Salvatori, Roberta; Anesi, Alexandre; Cavazzoli, Chiara; Zambon, Alfonso; Lusvardi, Gigliola. - In: JOURNAL OF THE AMERICAN CERAMIC SOCIETY. - ISSN 0002-7820. - (2025), pp. 20395-20404. [10.1111/jace.20395]*

Double-ion doped mesoporous glasses: Studies on stability, antibacterial and antioxidant properties, and bioactivity

Cavazzoli, Chiara; Fraulini, Francesca; Nicolini, Valentina; Zardi, Paolo; Busi, Enrico; Raimondi, Stefano; Zambon, Alfonso; Lusvardi, Gigliola. - In: SURFACES AND INTERFACES. - ISSN 2468-0230. - 72:(2025), pp. 106954-106965. [10.1016/j.surfin.2025.106954]

Enhanced bone regeneration with cerium-doped bioactive glasses: In vitro and in vivo study

Salvatori, Roberta; Anesi, Alexandre; Chiarini, Luigi; Di Bartolomeo, Mattia; Pellacani, Arrigo; Cavazzoli, Chiara; Zambon, Alfonso; Lusvardi, Gigliola. - In: JOURNAL OF APPLIED BIOMATERIALS & FUNCTIONAL MATERIALS. - ISSN 2280-8000. - 23:(2025), pp. 1-15. [10.1177/22808000251326794]

Evaluation of the Properties of Bioactive Mesoporous Glasses Doped with Cerium and Loaded with Polyphenols

Giordana, Alessia; Cavazzoli, Chiara; Fraulini, Francesca; Zardi, Paolo; Zambon, Alfonso; Cerrato, Giuseppina; Lusvardi, Gigliola. - In: MATERIALS. - ISSN 1996-1944. - 18:3(2025), pp. 709-723. [10.3390/ma18030709]

Gelatin/Cerium-Doped Bioactive Glass Composites for Enhancing Cellular Functions of Human Mesenchymal Stem Cells (hBMSCs)

Iodchik, Andrey; Lusvardi, Gigliola; Zambon, Alfonso; Soo Lee, Poh; Hans-PeterWiesmann, ; Bernhard, Anne; Hintze, Vera. - In: GELS. - ISSN 2310-2861. - 11:6(2025), pp. 2-32. [10.3390/gels11060425]

Polyphosphate coacervate gels for manufacturing of manganese loaded glass powders and fibres: structural, cytocompatibility and surface bioactivity study

*Cavazzoli, Chiara; Di Pasquale, Roberto; Moghaddam, Zarrin; Zhao, Hongjuan; Hoxha, Agron; Lewendon, Lauren; Felipe-Sotelo, Monica; Crean, Carol; Zambon, Alfonso; Lusvardi, Gigliola; Merino-Gutierrez, Jorge; Carta, Daniela. - In: JOURNAL OF MATERIALS CHEMISTRY. B. - ISSN 2050-7518. - 13:30(2025), pp. 9153-9165. [10.1039/d5tb00454c]*2025

Collaborations

Department of Chemical and Geological Sciences, UNIMORE (Modena, Italy): *Prof M. Cocchi, Prof. G. Malavasi, Prof. D. Malferrari, Prof. M.C. Menziani, Prof. A. Pedone, Prof. L. Tassi*.

Department of Life Sciences, **UNIMORE** (Modena, Italy): *Prof. M. Rossi, Prof. F. Pellati, Dott. S. Raimondi.*

Department of Maternal, Child and Adult Medical and Surgical Sciences, **UNIMORE** (Modena, Italy): *Prof. U. Chiarini, Prof. A. Anesi, Dott. R. Salvatori.*

Department of Chemistry, Interdepartmental Center "Nanostructured Interfaces and Surfaces" (NIS), UNITO (Torino, Italy): *Prof. G.Cerrato, Dr. A.Giordana.*

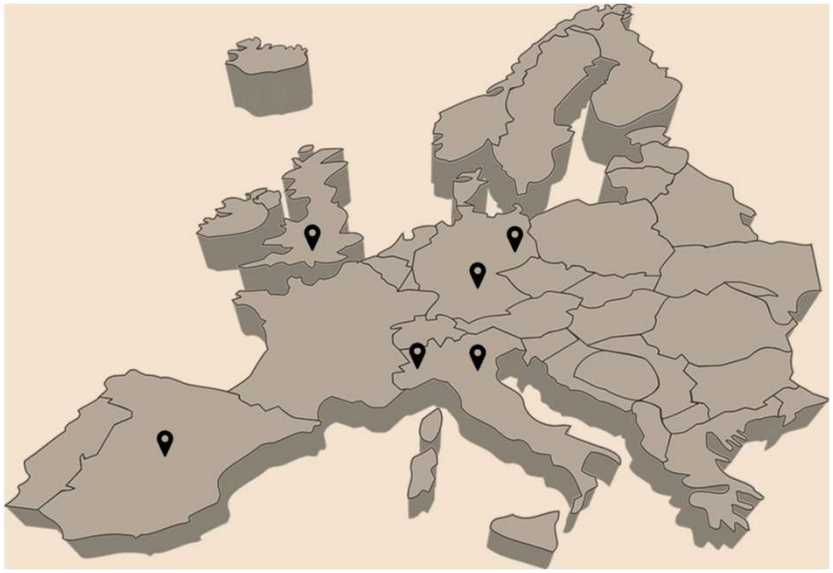
Department of Health Sciences, UPO (Novara, Italy): *Prof. L.Rimondini, Prof. A Cochis.*

University of Erlangen (Nuremberg, Germany): *Prof. A.R. Boccaccini.*

Technische Universität (Dresden, Germany): Prof. V. Hintze.

Universidad Complutense (Madrid, Spain): *Prof. M.N. Gòmez-Cerezo*, *Prof. A.Salinas, Prof. M.V. Regi.*

University of Surrey (Guildford, UK): *Dr. D. Carta.*



cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

CA22170 - TEndon Regeneration NETwork (TENET)

gigliola.lusvardi@unimore.it

alfonso.zambon@unimore.it

paolo.zardi@unimore.it

chiara.cavazzoli@unimore.it

chiara.grassi@unimore.it

valentina.nicolini@unimore.it

UNIMORE Research Group:

Chemistry for Health (C4H)

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