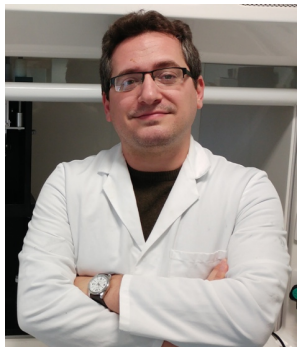
BRITISH COUNCIL

RESEARCHER LINKS

Newton Fund

Research Profile



Name: **Dr Martin Eduardo Santocildes Romero**

Position: **Postdoctoral Research Associate**

Institute/division: **School of Clinical Dentistry, University of Sheffield**
EPSRC MeDe Innovation

Email: m.e.santocildes-romero@sheffield.ac.uk

Tel: **(00) 114 271 7890**

SUMMARY OF MY RELEVANT RESEARCH AREAS:

Brief summary of your research areas, in English

My main research area is the development of functionalised membranes for tissue engineering and regenerative medicine (e.g. bone and cartilage repair) using electrospinning. Additionally, I am working on the development of bioadhesive electrospun patches for clinical dental applications (e.g. localised drug delivery).

Brief summary of your research areas, in Chinese *we will translate this for non-Chinese speaking UK participants*

Primary Research interests:

I am a graduate in Biology (University of Malaga, Spain) and Biomedical Engineering (University of Sheffield, UK), and I have undertaken research leading towards a PhD at the University of Sheffield on the development of electrospun materials containing strontium-substituted bioactive glasses for bone tissue regeneration. Currently, I am working as a Postdoctoral Research Associate at the School of Clinical Dentistry of the University of Sheffield on a project funded by EPSRC MeDe Innovation.

My main research interests and areas of expertise are:

- **Development of functionalised biomaterials for enhanced tissue regeneration:** Combination of bioresorbable polymers and bioactive materials (e.g. bioactive glasses, proteins) using electrospinning; Manufacture of composite biomaterials; Characterisation of material properties (e.g. SEM, XRD, DTA) and biological properties (e.g. cytotoxicity, osteogenic properties) of biomaterials.
- **Development of drug delivery systems:** Development of bioadhesive polymeric compositions using pharmaceutically approved polymers; Manufacture of electrospun patches for clinical dental applications.
- **Cell culture:** Extensive experience working with animal cell lines (e.g. Rat osteosarcoma, L929, MG63) and primary cells (e.g. Mesenchymal stromal cells isolated from rat bone marrow; Bovine synovial fluid mesenchymal stromal cells) for the biological characterisation of biomaterials.

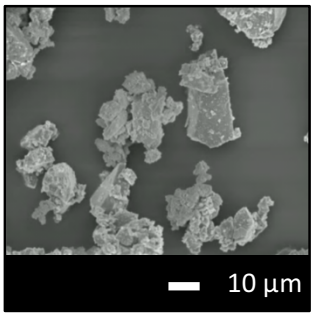
Topics in which you would like to develop collaborative research:

- Development of biofunctionalised electrospun membranes combining polymers and/or proteins (e.g. collagen, proteoglycans, elastin) for the repair of bone, cartilage or ligaments.
- *In vivo* study of composite electrospun membranes made of bioresorbable polymers and particles of bioactive glasses (e.g. 45S5, strontium-substituted bioactive glass).

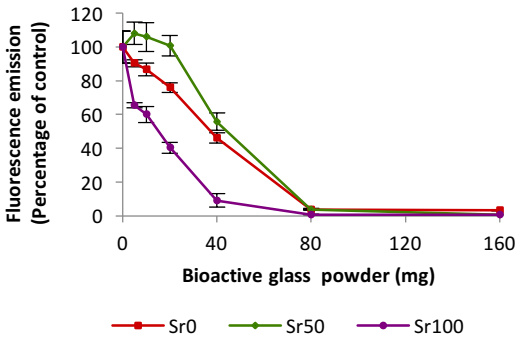
Relevant existing collaborations (academic/clinical/commercial) inside or outside China.

- Ongoing collaboration with researchers from MeDe Innovation institutions: Mr Thomas Paterson (University of Sheffield) and Dr Maria Katsikogianni and Dr Karthik Nair (University of Bradford) for the development of novel biomaterials with osteogenic and antibacterial properties.

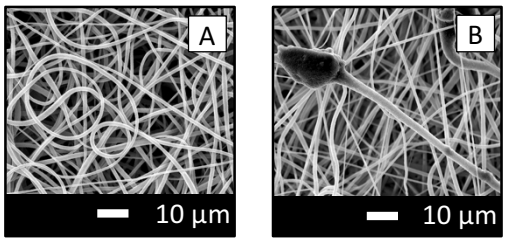
Relevant graphics, figures, pictures:



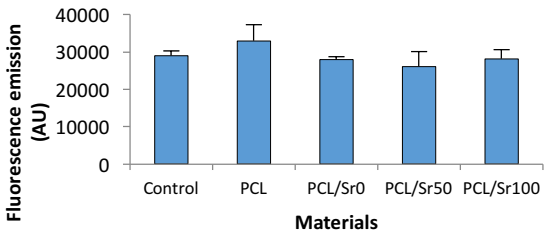
SEM micrograph of strontium-substituted bioactive glass powder (<45µm particle size).



The increased solubility of strontium-substituted glass resulted in a greater cytotoxic effect. However, 50% substitution (Sr50) had a stimulating effect when small amounts (<20 mg) were used.



SEM micrographs of (A) electrospun PCL fibres, and (B) electrospun composite fibres made of PCL and bioactive glass particles. The composite fibres in (B) show regions of increased diameter where the particles accumulate.



Rat osteosarcoma cells cultured on samples of the composite electrospun membranes showed good *in vitro* biocompatibility, as measured using the PrestoBlue viability assay.

Publications and other outputs relevant to your interest in this programme (up to 5)

1. Santocildes-Romero ME, Goodchild RL, Hatton PV, Crawford A, Reaney IM, Miller CA. Preparation of composite electrospun membranes containing strontium-substituted bioactive glasses for bone tissue regeneration. Macromol Mater Eng. 2016;301(8):972–81.

2. Santocildes-Romero ME, Crawford A, Hatton PV, Goodchild RL, Reaney IM, Miller CA. The osteogenic response of mesenchymal stromal cells to strontium-substituted bioactive glasses. J Tissue Eng Regen Med. 2015 May;9(5):619–31.