PhD Advert Template

Project title: Development of bioinks to bioprinit an *in vitro* model of the gut mucosa

Project ID *(optional)*:

Accept all year-round applications

Funding information: Self-funded students only

Project description: This research aims to study the influence of inflammatory bowel disease (IBD) on the onset of ankylosis spondylarthritis (AS) through 3D *in vitro* modelling of the synovium and gut, in healthy and inflamed states, assessing changes in cell phenotypes and cytokine production. IBD is a chronic disorder of the gastrointestinal tract characterized by intestinal inflammation and epithelial injury often cause by bacterial infection. In the UK around 620k people are affected by it, translating in NHS costs of £1 billion per year1–3

. Clinically, up to 35% of patients with IBD display musculoskeletal disorders such as axial and peripheral arthritis syndrome, inferring that these two pathologies are connected. To study how the gut reacts to bacteria (indirect and direct) a 3D model of the gut mucosa will be created using bioprinting and novel biomaterials. This gut model will be subjected to inflammatory stimulus provoked by direct exposure to bacteria metabolites and inflammatory cytokines produced by the immune cells in the host. This is key to study the exchange of biological factors and the permeability of the finalised system and ensure the model functions as the normal gut.

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References (optional):

1. Ashrafi, M., Kuhn, K. A. & Weisman, M. H. The arthritis connection to inflammatory bowel disease (IBD): Why has it taken so long to understand it? *RMD Open* **7**, 1–9 (2021).

2. Trujillo-de Santiago, G., Lobo-Zegers, M. J., Montes-Fonseca, S. L., Zhang, Y. S. & Alvarez, M. M. Gut-microbiota-on-a-chip: an enabling field for physiological research. *Microphysiological Syst.* **2**, 7 (2018).

3. Neurath, M. F. Cytokines in inflammatory bowel disease. *Nat. Rev. Immunol.* **14**, 329–342 (2014).

Application enquires: Dr. Priscila Melo[*https://www.ncl.ac.uk/engineering/staff/profile/priscilamelo.html*](https://www.ncl.ac.uk/engineering/staff/profile/priscilamelo.html)

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[ ]  agricultural technology

[ ]  arable farming

[ ]  livestock farming

[ ]  forestry & arboriculture

[ ]  other

Anthropology

[ ]  biological anthropology

[ ]  social anthropology

[ ]  other

Architecture, Building & Planning

[ ]  architecture

[ ]  built environment

[ ]  construction management

[ ]  landscape architecture

[ ]  rural planning

[ ]  surveying

[ ]  urban planning

[ ]  other

Biological Sciences

[ ]  bacteriology

[ ]  behavioural biology

[ ]  biochemistry

[ ]  biodiversity

[ ]  bioinformatics

[ ]  biophysics

[ ]  biotechnology

[ ]  cancer biology

[x]  cell biology

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[ ]  ecotoxicology

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[ ]  environmental biology

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[ ]  genetic engineering

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[ ]  parasitology

[ ]  plant biology

[ ]  plant cell biology

[ ]  reproductive biology

[ ]  structural biology

[ ]  systematic biology

[ ]  virology

[ ]  zoology

[ ]  other

Business & Management

[ ]  accounting

[ ]  business

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[ ]  education management

[ ]  event management

[ ]  hospitality

[ ]  human resource management

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Chemistry

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Communication & Media Studies

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Computer Science

[ ]  artificial intelligence

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[ ]  computer graphics

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Creative Arts & Design

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[ ]  film studies

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[ ]  theatre studies

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Economics

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Education

[ ]  further education

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[ ]  primary education

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Engineering

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[ ]  energy technologies

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[ ]  systems engineering

[ ]  thermodynamics

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Environmental Sciences

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[ ]  marine sciences

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[ ]  pollution

[ ]  soil science

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Finance

[ ]  actuarial science

[ ]  banking

[ ]  financial management

[ ]  insurance

[ ]  investment

[ ]  taxation

[ ]  other

Food Sciences

[ ]  food hygiene

[ ]  food production

[ ]  other

Forensic and Archaeological Sciences

[ ]  archaeological science

[ ]  forensic science

[ ]  other

Geography

[ ]  agricultural geography

[ ]  cultural geography

[ ]  economic geography

[ ]  environmental geography

[ ]  geographical information systems gis

[ ]  historical geography

[ ]  human geography

[ ]  marine geography

[ ]  physical geography

[ ]  political geography

[ ]  remote sensing

[ ]  social geography

[ ]  transport geography

[ ]  urban geography

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Geology

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[ ]  geoscience

[ ]  geotechnology

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[ ]  volcanology

[ ]  other

History & Archaeology

[ ]  african history

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[ ]  social history

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Mathematics

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Medicine

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[ ]  ethics

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Veterinary Sciences

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