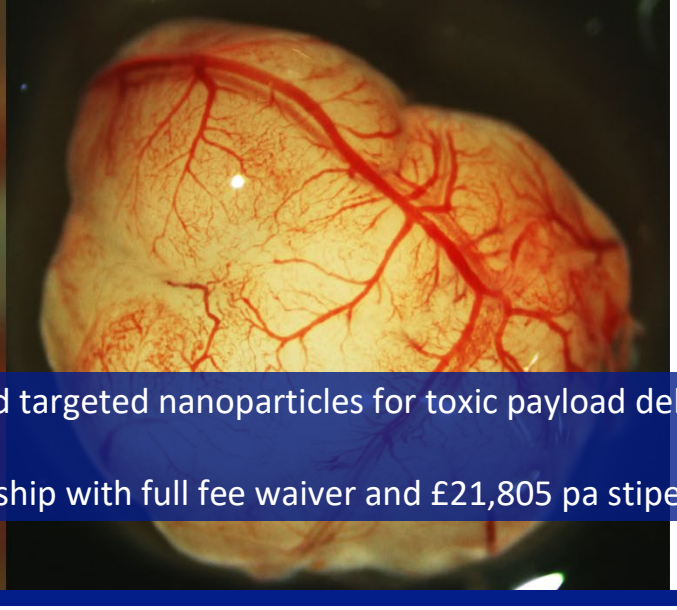




Bioengineered tumours and targeted nanoparticles for toxic payload delivery selectively to cancers

EPSRC funded PhD studentship with full fee waiver and £21,805 pa stipend (2026/27 rate)

Project Code: DLA_DTP_2026_01

Main Supervisor: Dr Simon Allison

Co-Supervisor: Dr Jessica Senior, Dr Kofi Asare-Addo, Prof Craig Rice

Project Introduction

A major cause of cancer treatment failure is adverse effects of the therapeutic drug on normal healthy tissue which limits the dose of drug that can be used. Such dose-limiting effects mean that a less effective concentration to eliminate tumour cells can be used. This PhD project will assess targeted drug delivery approaches such as tumour-targeting nanoparticles that are pre-loaded with the anti-cancer therapeutic as a potential solution to this problem. Bioengineered tumour models that more accurately mimic the complexity of tumours will be developed and used for evaluating targeted drug delivery and selectivity of effects towards tumour cells specifically.

Project Details

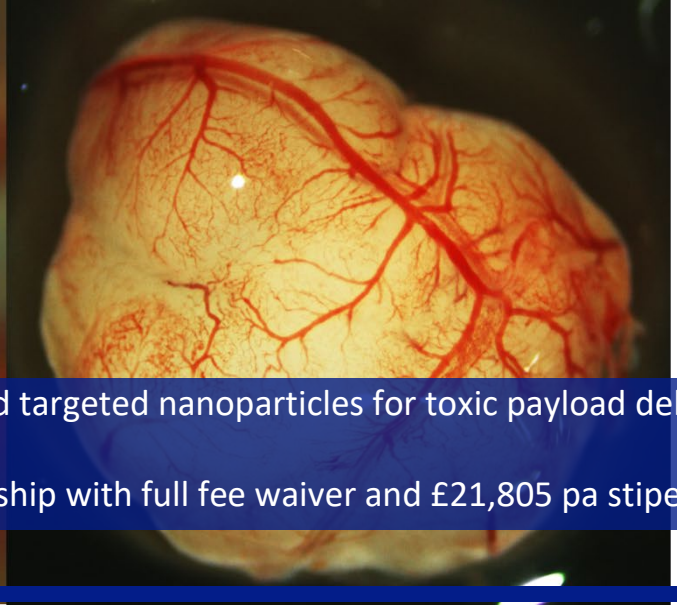
This is an inter-disciplinary PhD research project bringing together expertise in cancer biology, engineered tumour models, nanoparticle (NP) science, and novel chemical therapeutics providing invaluable experience to the student of interdisciplinary and collaborative research approaches.

The project aligns with a government priority to develop 'new approach methodologies' (NAMs) that decrease reliance on sentient animal models (https://post.parliament.uk/research-briefings/post-pn-0756/). The project will develop and utilise several different advanced tumour models that are more representative of patient tumours and that incorporate components such as extracellular matrix, physico-chemical gradients and other cell types that can each profoundly impact on response of tumour cells to drugs. This will include 3D-bioprinted tumour models allowing the generation of 'native-like' tumour architecture with extracellular matrix, spatially 'printed' tumour cells, and other non-cancer cell types using Suspended Layer Additive Manufacturing (SLAM) technology (Senior, J. *et al.* (2019) Advanced Functional Materials, 29:1904845).

Effects of different nanoparticles (non-targeted NPs and tumour cell-targeting NPs) formulated with different chemical payloads will be assessed against both patient tumour tissue explants and 3D-bioprinted tumour models. These will be evaluated both as 'standalone' models and also following *in ovo* implantation onto the highly vascularised, non-innervated chorioallantoic membrane (CAM) that forms within a fertilised chicken egg below which the immature chicken embryo develops. This is an established animal replacement and reduction model (3Rs model) up to development day 14 (UK Animals (Scientific Procedures Act) 1986, amended 2012). This 14-day non-sentient model is established in Applied Sciences for pre-clinical drug evaluation (e.g. Allison, S.J., *et al.* (2024) Chemistry - A European Journal. 30:e202302803). The model will allow assessment of the cancer selectivity of the treatment and of unwanted toxicology. Effects of treatment with payload alone compared to loaded NPs (non-targeted, and tumour cell-targeting) will be evaluated.

A variety of different tumour-targeting NP strategies will be tested for their effectiveness. This will include HA-functionalised NPs for targeting to CD44-overexpressing cancer cells (Gómez-Pastor, S. *et al.*, Colloids and surfaces. B, Biointerfaces (2025), 249:114504) and tumour cell membrane-derived NPs (Tapeinos C. *et al.*, J. Controlled Release (2023), 362:225-242). Different chemical payloads will be evaluated and the *in ovo* model will enable testing of different drug/NP administration routes.

Evaluation of tumour-targeting NPs in such advanced tumour models is a novel, innovative research area providing PhD training in a cutting-edge priority area.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Project-specific entry requirements

1st class or 2.1 Honours degree in Biology, Pharmacology, Bioengineering or a related discipline. Laboratory experience gained outside of undergraduate class practicals is preferable particularly in mammalian cell culture and a good theoretical knowledge of cancer biology.

Further Information

This call is open to **UK Applicants only**.

Applicants should be of outstanding quality and exceptionally motivated.

The studentships are funded for 3 years (subject to satisfactory annual performance and progression review) and will provide for tuition fees and a tax-free stipend paid monthly.

Please note that there are more projects than funded studentships available and therefore this is a competitive application process which will include an interview. Shortlisted candidates will be contacted for an interview in person or via Teams. After interview the most outstanding applicants will be offered a studentship.

Queries about the application process are welcome and should be emailed to pgrscholarships@hud.ac.uk.

Informal enquiries about this project should be directed to Dr Simon Allison.

Type of Award: Doctor of Philosophy (PhD).

Eligibility: UK applicants only. First Class or Upper Second-Class Honours degree or equivalent in a relevant subject area, please refer to the entry requirements on the specific projects being advertised.

Location: Huddersfield.

Funding: 3 years full time research covering tuition fees and a tax-free bursary (stipend) starting at £21,805 for 2026/27 and increasing in line with the EPSRC guidelines for the subsequent years. Funded via the Engineering and Physical Sciences Research Council Doctoral Training Programme.

Duration: 3 years full-time plus 12 months writing up (please note that no funding is available for the writing up period).

Closing date: 28th April 2026

Start date: 1st October 2026

Application details

- Go to the EPSRC webpage and download the Expression of Interest Form 2026.
- Provide copies of transcripts and certificates of all relevant academic and/or any professional qualifications.
- Provide references from two individuals – please contact your referees and ask them to send them directly to pgrscholarships@hud.ac.uk from their email address.
- Proof of eligibility – e.g. scan of passport photo page
- Completed forms, including all relevant documents should be submitted via-email to pgrscholarships@hud.ac.uk.

Please note: if you do not attach all the relevant documentation prior to the closing date your application will not be considered.

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