

3D bioprinted living models for continuous co-culture of human cervical cancer cells and vaginal microbiota



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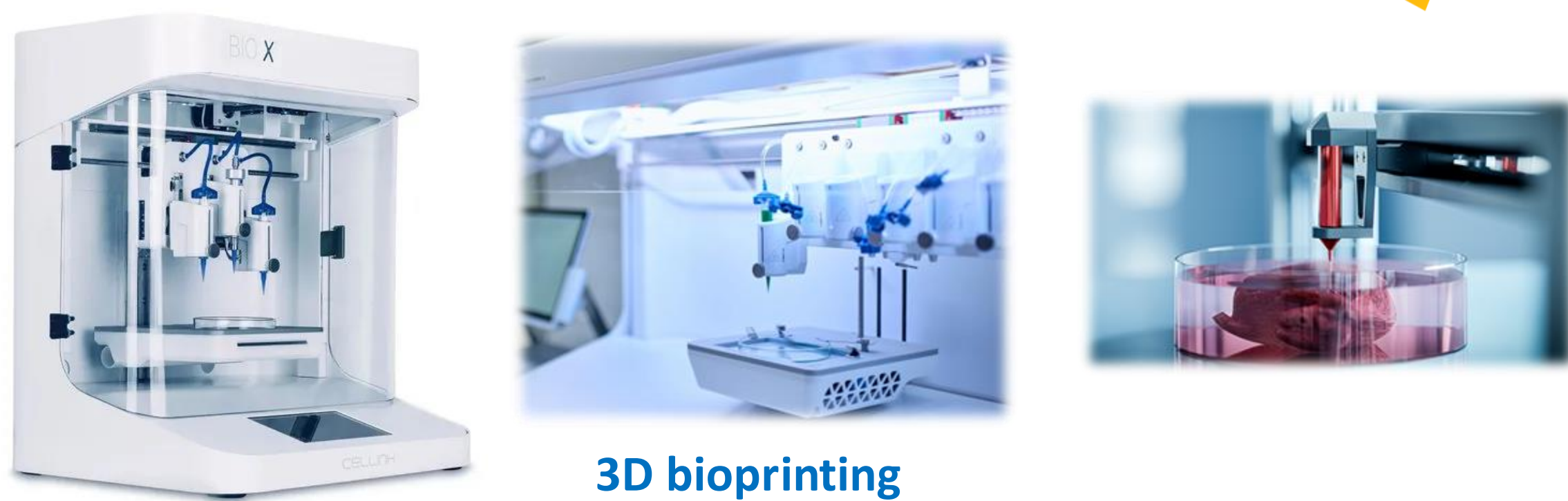
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Background

The field of 3D bioprinting, a significant offshoot of 3D printing, has advanced to fabricate functional structures using layers of biomaterials to create biological components. The potential of 3D bioprinting in biomedical applications is promising, as it enables the creation of cell scaffolds for tissue engineering and allows for the replication of human tissue architecture using microfluidics. Microbial bioprinting holds promise for diverse biomedical and environmental applications; however, its development has been limited.

Bioprinting of cellular environments could help:

- to investigate effects of different nutrients, or medical drugs or neurotransmitters on body systems activity and its flora;
- to investigate host-pathogen-herbal supplementation interactions.



3D bioprinting

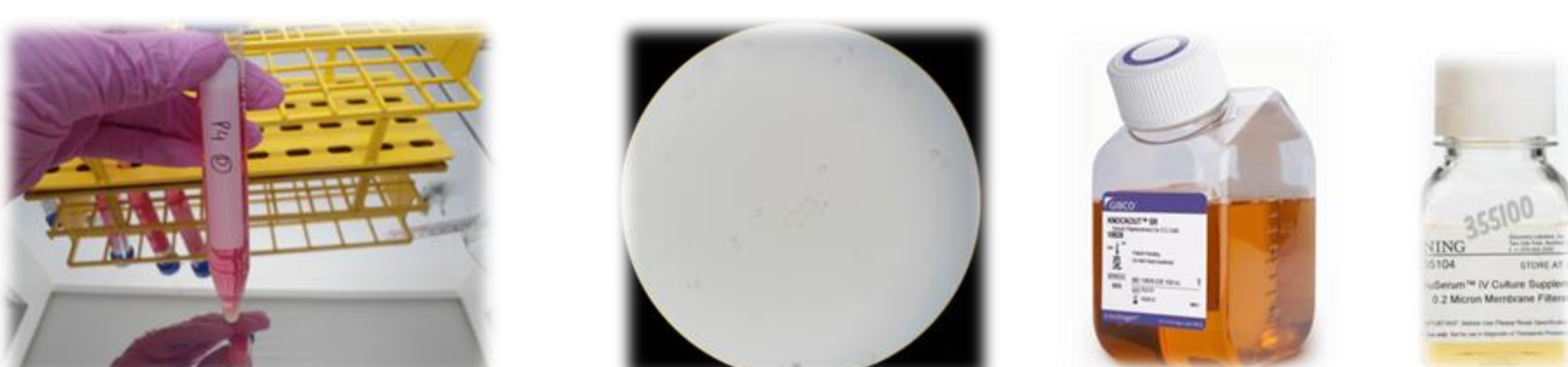
Objectives

This project will focus on the development of techniques, their practical evaluation and applications to support preparation of 3D living environments using different matrix material, human cervical cancer epithelial cells and vaginal microbial flora.

Animal Free Educational and Scientific Research



Replacement of Animal Products in Laboratory Experiments

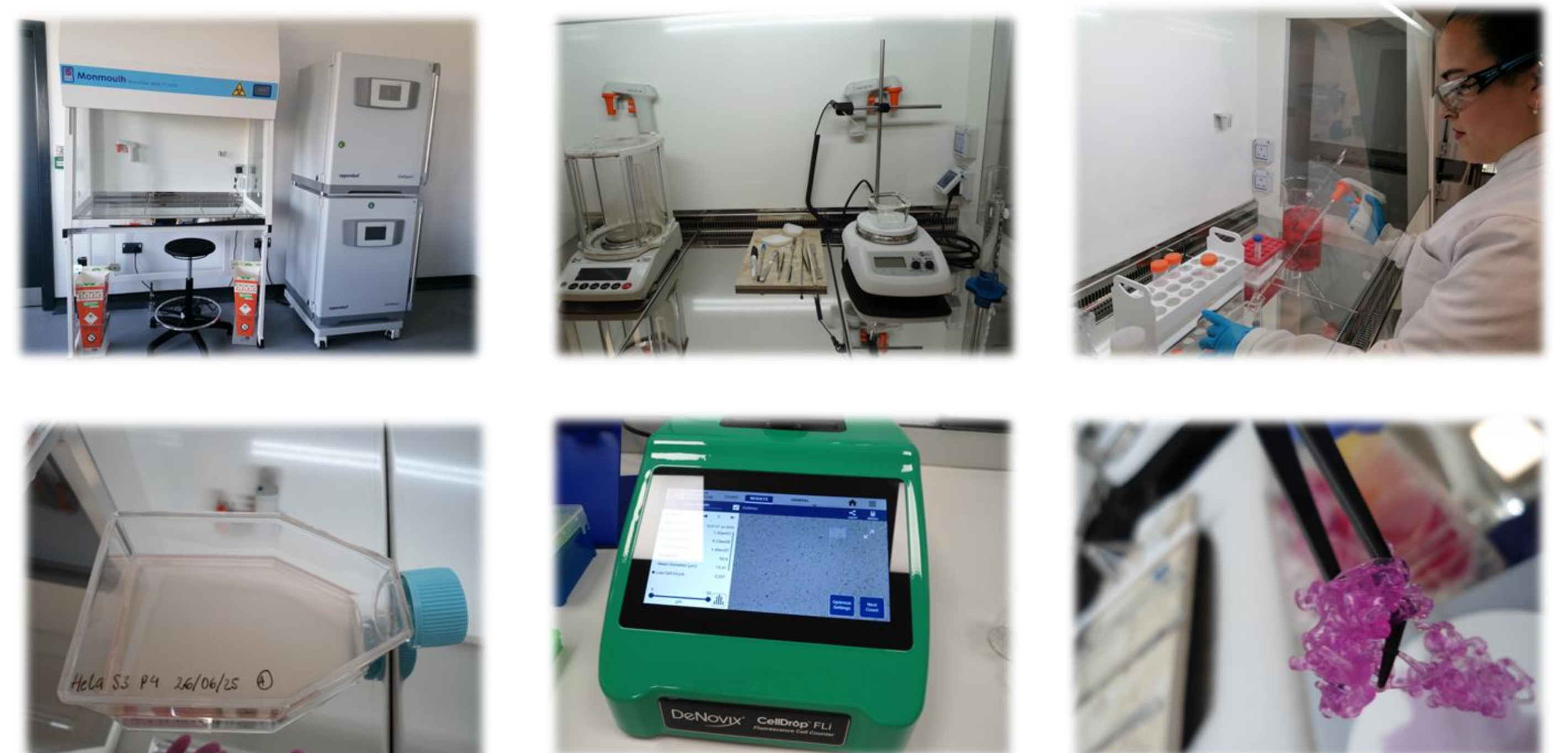


Reduction of Laboratory Plastics in Education and Scientific Research



Methods

A selection of matrix materials will be tested to design an optimised bio-ink that can facilitate and promote cell-to-matrix interactions between cells and scaffolds. The cellular connections, interactions and behaviour of human cervical cancer cells with vaginal microbial organisms in 3D bio-constructs will be evaluated.



Results

The expected results will include the establishment of an optimal composition of matrix materials. Also, results will help in evaluation of the cellular adherence and viability of human cells in supporting matrix with the addition of microbial organisms. This advancement can provide valuable insights into the vaginal microflora and contribute to the development of treatments.



Conclusions

The composition of the matrix and an addition of microbial flora could affect cellular interactions and growth, making scientific experiments like the real-life environment. 3D living environments as models could be used for future research and development of targeted gynaecological cancers therapies.

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