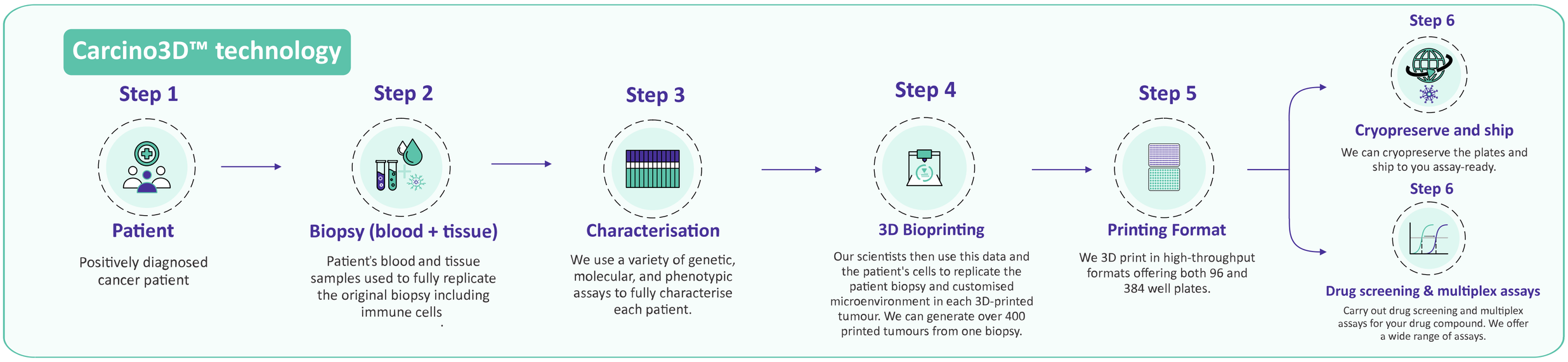
Kamila Pawlicka[1], Calum McMullen[1], Ellis Smith[1], Ishani Malhotra[1]
[1]Carcinotech, Roslin Innovation Centre, Edinburgh, UK

Patient-derived Carcino3D™ printed tumours as a relevant tool for pre-clinical research and drug development

Figure 1. Carcinotech's Workflow



Introduction

Carcinotech is reinventing cancer research by manufacturing 3D printed living tumours using patient-derived biopsies, primary cells, immune cells and cancer stem cells. Carcinotech's advanced printed tumours provide a platform for rapid, ethical, and accurate drug screening, pre-clinical and personalised medicine testing. Characterisation of patient cell populations allows accurate representation of the primary tumour microenvironment in Carcinotech's 3D-printed tumours. The Tumour Microenvironment (TME) comprises cells of the immune system, a complicated network of fibroblasts, blood vessels, lymphatics and the cells of the cancer itself. Various techniques, such as histology, flow cytometry, and immunohistochemistry, are being used to identify cell populations that make up the TME.

Figure 2. Histological comparison of 3D-printed models to original tumour tissue

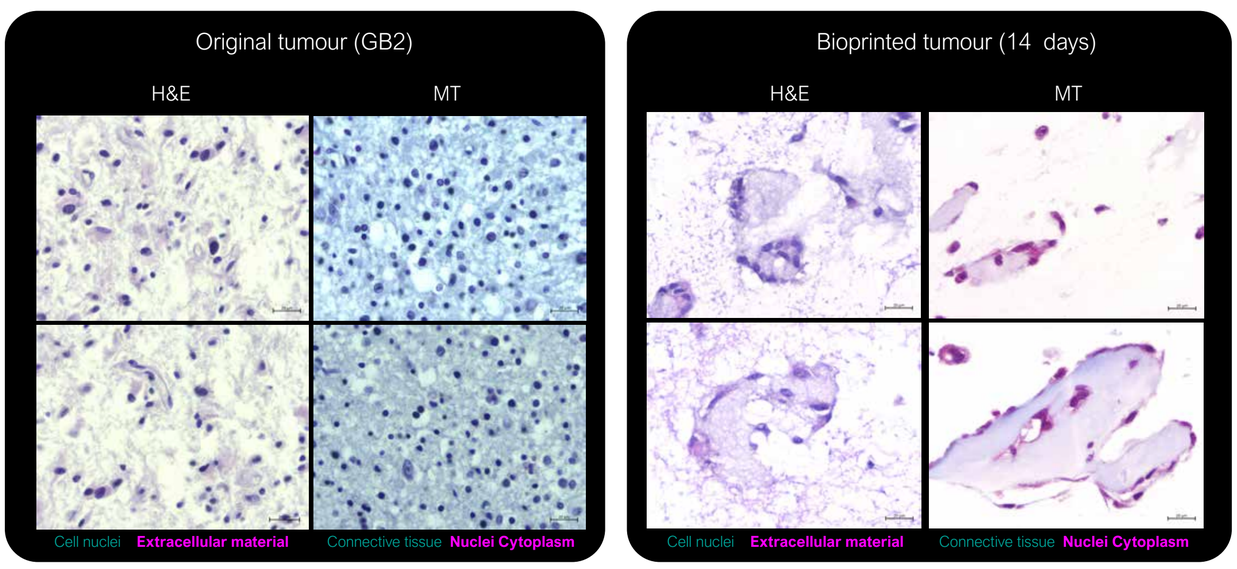


Figure 3. Phenotypic characterisation of 3D-printed GBM models and original tumour sample through immunofluorescence staining

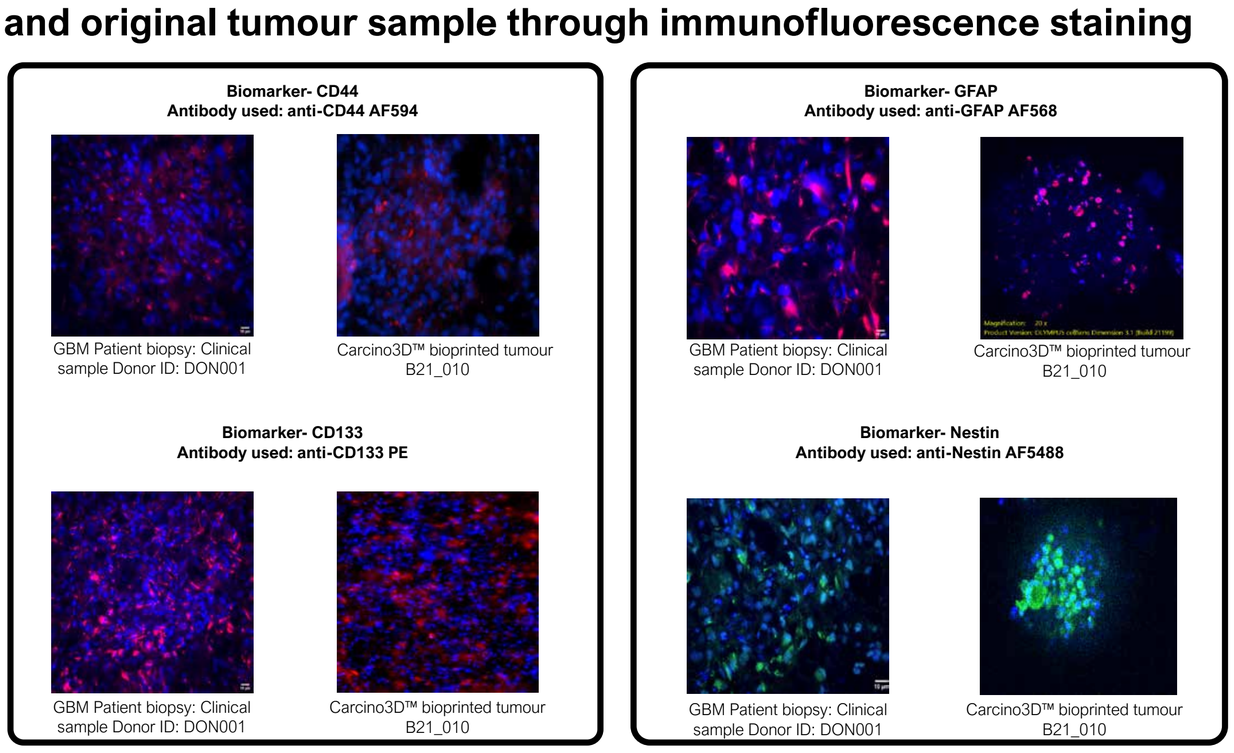


Figure 4. Immune composition of original tumour tissue via flow cytometry analysis

The composition of tumour inflitrating immune cells can serve as biomarkers for predicting responses to treatment and survival in different patient subgroups in terms of chemotherapy and immunotherapy.

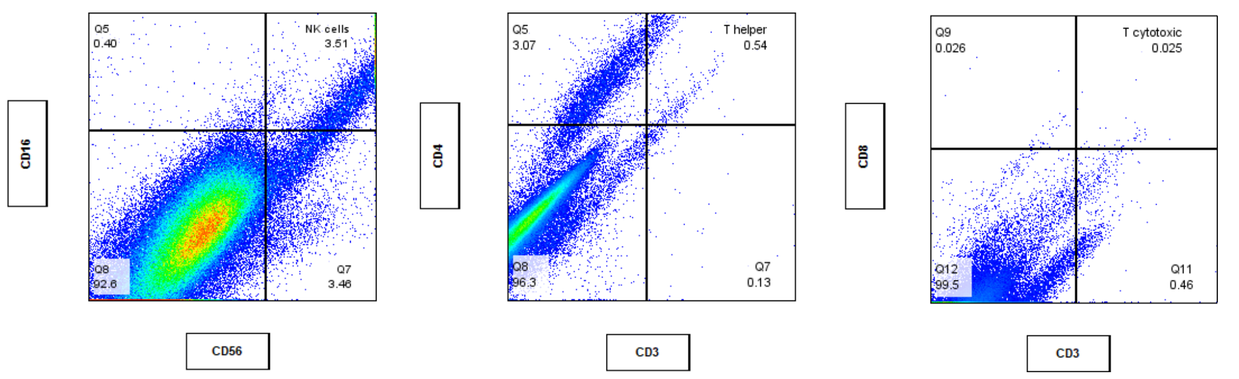
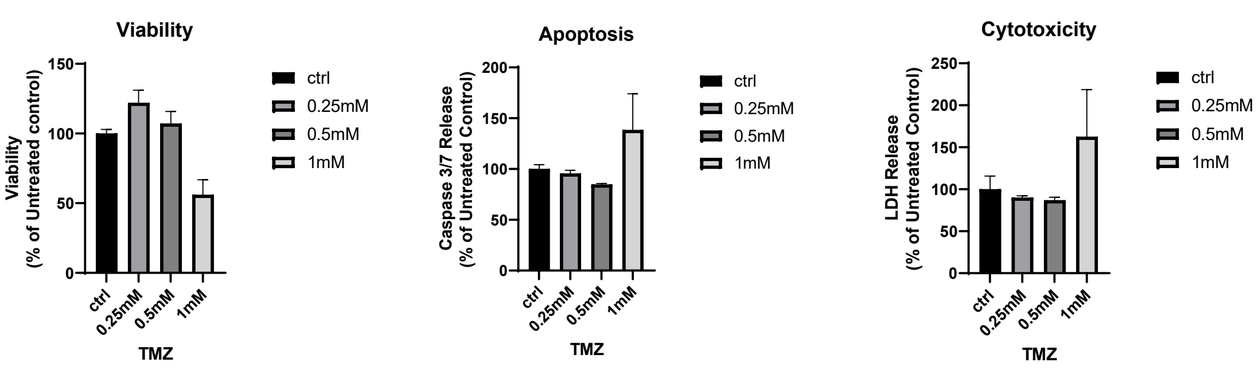


Figure 5. Drug response of bioprinted GBM models to TMZ

Bioprinted tumours from GBM were treated with standard of care drug temozolomide (TMZ) in 3 different concentrations (0.25, 0.5, 1mM) for 72 hours. Three assays were performed in a multiplex format. Viability (Cell-titer Glo), Cytotoxicity (LDH), Apoptosis (Caspase 3/7).



Summary

Carcino3D™ printed GBM tumours offer a platform for in vitro high-throughput, accurate, and rapid drug disocvery and screening for novel, combinatorial and repurposed drugs. The printed tumours can be used for drug efficacy, drug pathway, and cytotoxicity testing. They are bioengineered to de-risk cancer drug testing and pre-clinical trials offering translational data with respect to cancer heterogeneity and microenvironments. As we obtain patient biopsies and blood from a diverse patient population, we are able to predict immune responses and perform personalised medicine testing predicting the right treatment options for patients.

Carcinotech Ltd
Roslin Innovation Centre, Easter Bush Campus,
Edinburgh, EH25 9RG United Kingdom

Email: info@carcinotech.co.uk
Website: www.carcinotech.co.uk

in : Carcinotech