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**082 Patient derived renal cell carcinoma tumouroids for personalised renal cancer medicine**

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**Introduction:** Despite the significant advancements in the therapeutic management of renal cell carcinoma (RCC), there is still a pressing need for patient-specific platforms that can predict personalised treatment response. This study aims to optimise renal cancer tumouroids: 3D in vitro models that mimic the tumour density, and incorporate primary cells isolated from RCC surgical specimens and extracellular matrix components to recapitulate the tumour microenvironment.

**Methods:** RCC samples were collected post-surgery (n=16), disaggregated using different methods and the isolated cells were grown in 2D and tumouroids. Cell proliferation was compared among different culture conditions by measuring ATP production. Tumouroids were also challenged with a clinically used tyrosine kinase inhibitor, pazopanib. Immunofluorescence and confocal microscopy were used to detect expression of RCC markers and whole-exome sequencing was performed to investigate tumouroids’ resemblance to the parental tumour.

**Results:** Patient-derived RCC tumouroids retain the expression of renal cancer associated gene markers, including mutant VHL, and protein markers, including cytokeratins and epithelial-tomesenchymal markers. A non-linear increase in proliferation was observed in the tumouroids which may be indicative of 3D organization and other cellular functions. Tumouroids’ response to pazopanib ranged from none to strong (40%) and tumouroids of higher complexity, that incorporated a stromal compartment, responded stronger than simpler tumouroids (n=3).

**Conclusion:** Our results indicate that RCC cells maintain their phenotype and genotype when grown as tumouroids. Future work will compare the response from tumouroids to the responses from both xenografts and the actual patients to determine the suitability of tumouroids as personalised cancer treatment platforms.

**Take-home message:** Renal Cell Carcinoma cells isolated from human patients maintain their phenotype and genotype when grown in biomimetic tumouroids and respond to treatment.