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Cancer stem cells in renal clear cell carcinoma

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Introduction & Aim: Renal cell carcinoma is the ninth most common cancer worldwide, with renal clear cell carcinoma (RCCC) making up 80-85% of these. Current treatment for RCCC involves nephrectomy with 40% developing a recurrence with an overall 5-year survival rate of 10%. This study aimed to characterise these CSCs.

Methodology: DAB immunohistochemical (IHC) staining was performed on six CRCLM samples for CSC markers OCT4, SOX2, NANOG, c-Myc and KLF4. Immunofluorescent (IF) IHC staining was performed to investigate the co-expression of two markers. NanoString and *in situ* hybridisation (ISH) mRNA analyses were performed for transcriptional expression. Cell counting was performed on the IHC and ISH stains and the *t*-tests for statistical analysis.

Results: DAB IHC staining demonstrated the expression of all 5 CSC markers in RCCC, and supported by NanoString and ISH analyses. IF IHC staining demonstrated the co-expression of OCT4 in a proportion of the SOX2+/NANOG+/KLF4+ populations. Furthermore the co-expression of KLF4 was also demonstrated in a proportion of the SOX2+/NANOG+/KLF4+ population. Cell counting demonstrated a high abundance of NANOG (86%), SOX2 (83%) and c-Myc (80%), with lower counts for KLF4 (15%) and OCT4 (8%).

Conclusion: This study shows a range of CSC sub populations within RCCC with a less abundant OCT4+/c-Myc+/SOX2+/NANOG+ sub population and a KLF4+/c-Myc+/SOX2+/NANOG+, this is supported by relatively low abundance of OCT4+ and KLF4+ cells. These novel findings support the presence of potentially two subpopulations of CSCs within RCCC, although equally as likely is that the OCT4+ cells are a subset of the KLF4+/c-Myc+/SOX2+/NANOG+ cells.

Biography

Tinte Itinteang serves as the current Chief Scientific Officer and the Evans Family Research Fellow of the Gillies McIndoe Research Institute (GMRI) in Wellington, New Zealand. He completed his Medical Training at the Melbourne University in 2001, and then completed his Basic Medical Residency in New Zealand, from 2008-2010. He completed his PhD from Victoria University of Wellington, NZ on the role of stem cells and the renin-angiotensin system (RAS) in infantile haemangioma. From 2012-2014, he was appointed as a Research Fellow at the Gillies McIndoe Research Institute, during which he spent six weeks at the Friedlander laboratory at The Scripps Research Institute in San Diego investigating the role of iPSCs for disease modelling. He was then appointed as the Chief Scientist of the GMRI from 2015. His work on the role of stem cells and the RAS in infantile haemangioma has been acknowledged with the International Society for the Study of Vascular Anomalies John Mulliken award as well as several national and international honours. He is the author of over 50 peer reviewed articles and has given over 100 presentations at international conferences.

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