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Cancer stem cells in metastatic colon adenocarcinoma to the liver

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Introduction: Colorectal cancer (CRC) is the third most common cancer in the USA. Approximately 20% of CRC patients present with synchronous liver metastasis at the time of diagnosis and overall 50% develop liver metastasis during the course of their disease. The median survival of CRC patients with liver metastasis (CRCLM) is 5-20 months if left untreated. This study aimed to identify and characterise the CSC population in CRCLM using OCT4, SOX2, NANOG, c-Myc and KLF4.

Methodology: DAB immunohistochemical (IHC) staining was performed on six CRCLM samples for OCT4 SOX2, NANOG, c-Myc and KLF4. Immunofluorescent (IF) IHC staining was performed to investigate co-expression of markers. Nanostring *in situ* hybridisation (ISH) mRNA analyses was performed for the transcriptional activation. Cell counting was performed on IHC and ISH stains. 2 test and the *t*-tests were used for statistical analysis to compare the cells within the tumour nests (TNs) and those within the peritumoural stroma (PTS).

Results: IHC staining demonstrated the expression of OCT4 SOX2, NANOG, c-Myc and KLF4 within CRCLM. IF IHC staining showed the presence of three CSC: (i) SOX2+/NANOG+/KLF4+/cMYC+/OCT sub population within the TNs; (ii) SOX2+/NANOG+/KLF4+/cMYC+/OCT4- sub population and (iii) SOX2+/NANOG+/KLF4+/cMYC+/OCT4+ sub population, in PTS. Nanostring transcriptional demonstrated the expression for all markers, except for SOX2. ISH confirmed the expression for all the markers.

Conclusion: This study demonstrates 3 putative sub-populations of CSCs within CRCLM: one within the TNs and two in PTS. OCT4 was only observed in the CSC subpopulation within the PTS, offering novel insights into the biology of this cancer.

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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