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Monitoring cancer progression by detecting circulating cancer cells with both epithelial and mesenchymal features

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Isolation of circulating tumour cells (CTCs) from peripheral blood has the potential to provide an easier 'liquid biopsy' than tumour tissue biopsies, to monitor disease progression and response to therapies at cell and molecular level. Previous studies on CTCs have mainly focused on the identification of cytokeratin (CK)+/CD45- epithelial cells. However, epithelial to mesenchymal transition is a critical step for tumour metastasis. We optimised a size-based platform, Parsortix, for the isolation of CTCs with both epithelial and mesenchymal properties and developed a multiple FISH rehybridization method to analyse multiple genomic changes on the CTCs after immunofluorescence signals were completely striped. Three types of CD45- potential circulating tumor cells, CK+/vimentin-, CK+/vimentin+ and CK-/vimentin+, were detected. Genomic alterations were detected in a similar large proportion of cells in all the three groups by analysing several genomic regions, indicating that the majority or all of those CK-/vimentin+/CD45- cells are circulating prostate cancer cells under epithelial to mesenchymal transition. In addition, the number of CK-/vimentin+/CD45- CTCs correlated better with cancer progression features than CK+ CTCs. Therefore, we developed a novel CTC detection and genomic analysis approach, which can efficiently analyse both CK+ and CK-/vimentin+/CD45- cancer CTCs. This greatly enhances our ability to investigate cancer metastasis process and using CTCs to monitor cancer progression and therapeutic response..

Biography

Yong-Jie Lu has completed his MD in 1992 and PhD in 1995. He did his Post-doctoral studies in Cancer Genetics at Institute of Cancer Research, London and set up his own research team for male urological cancer genetic and biomarker studies at Barts Cancer institute, Queen Mary University of London in 2003. He is a Reader in Medical Oncology at Queen Mary University of London. He has published more than 100 papers in reputed journals and has been serving as Editorial Board Member of a number on international scientific journals.

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