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Differential miRNAs expression profiles classify mucin 1(+)/(-) human breast cancer stem cells

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Background: Mucin 1 (Muc1) is a secreted, oncogenic mucin that is aberrantly overexpressed in breast cancer cells but its potential role in breast cancers stem cells (BCSCs) have not been explored. MicroRNAs (miRNA), small noncoding RNAs that play critical roles in normal stem cell functions during development, have emerged as important regulators of BCSCs as well.

Methods: Muc positive (+)/(-) cells were isolated from patient-derived cancer (n=25), and normal BC tissues (n=15) and propagated in non-adhesive suspension cell culture to assess their phenotypic characteristics. Further miRNAs expression profiling was done by using microRNA TaqMan® Low Density Array Cards v2.0 (TLDA cards A, Invitrogen), based on qReal-Time PCR array.

Results: Significantly altered expression of miRNAs were found (17 upregulated and 29 down regulated) in Muc (+) BCSCs as compared to Muc(-) (p<0.05). All these miRNAs were having significant role in BCSCs self-renewal, proliferation potential and were also involved in cancer metastasis. Further, selected miRNAs expression levels were individually tested and validated in mammospheres generated from tissue samples. Muc(+) BCSCs were showing higher level of miRNAs -9, 16, 34a, 195-5p and 454 as compared to Muc(-) BCSCs. Significantly downregulated expression of miR-106a, 125b and 218 was also noted in Muc (+) BCSCs as compared to adhered and Muc(-) cell population.

Conclusions: These miRNAs can potentially be used to develop a panel for classification and prognosis in order to better predict the progression of the disease and facilitate the choice of treatment strategy.

Biography

Madhulika Singh has completed PhD in the year 2003 from University of Lucknow (India) and Postdoctoral studies from CSIR-Indian Institute of Toxicology Research, Lucknow (India). Presently, she is working as Faculty in Department of Zoology at Maharishi University of Information Technology, Lucknow, India. She has published more than 36 research papers, review articles and book chapters in reputed journals and also been serving as an Editorial Board Member and Reviewer in many journals. Her research is based on understanding the self-renewal and differentiation capacities of cancer stem-like cells. Along with this, she is also engaged in discovering the scientific basis for anticancer activities of phytochemicals.

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