Ryou-u Takahashi et al., J Mol Genet Med 2015, 9:3
http://dx.doi.org/10.4172/1747-0862.S1.006

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International Conference and Exhibition on

Molecular Medicine and Diagnostics

August 24-26, 2015 London, UK

Loss of microRNA-27b-mediated gene repression promotes the generation of breast cancer stem cells

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Accumulating lines of evidence suggest that the key property that distinguishes cancer stem cells (CSCs) from non-CSCs is the ability to create their abnormal niche that remains in a dormant and tolerant state under stressful exposures such as conventional chemotherapy and radiotherapy. However, the molecular mechanisms for the generation of CSC niche remain elusive. In this study, we show that microRNA-27b (miR-27b) plays important roles in the generation of breast CSCs (BCSCs).The down-regulation of miR-27b was essential for the generation of BCSCs that show the self-renewal, drug tolerant and high tumorigenic activities. Further analysis revealed that miR-27b overexpression inhibited the drug-resistance and tumor seeding ability of breast cancer cells via suppressing the non-CSC to CSC transition under stressful exposures. Therefore, these findings elucidate a new molecular mechanism for the generation of BCSCs and suggest that modulating miR-27b with conventional anticancer treatments might be a promising approach to overcome BCSCs.

Biography

Ryou-u Takahashi is a Staff Scientist of Division of Molecular and Cellular Medicine at the National Cancer Center Research Institute, Tokyo. After he got a PhD in 2008 in Tokyo Institute of Technology, he went on to do a Post-doc at the National Cancer Center Research Institute. He focuses the development of novel animal models, methods and strategies to study the molecular mechanisms for the acquisition of CSC properties; especially the current focus is siRNA- and miRNA-based therapy against CSCs.

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