World Academy of Science, Engineering and Technology
International Journal of Biological and Ecological Engineering
Vol:12, No:11, 2018

Circadian Expression of MicroRNAs in Colon and Its Changes during Colorectal Tumorigenesis

Authors : Katerina Balounova, Jiri Pacha, Peter Ergang, Martin Vodicka, Pavlina Kvapilova

Abstract : MicroRNAs are small non-coding RNAs involved in a wide range of physiological processes. Post-transcriptional regulation of gene expression by microRNAs gives the organism a further level of control of the gene-expression program and the disruption of this microRNA regulatory mechanism seems to increase the risk of various pathophysiological conditions including tumorigenesis. To the present day, microRNAs were shown to participate in the mayor signalization pathways leading to tumorigenesis, including proliferation, cell cycle, apoptosis and metastasis formation. In addition, microRNAs have been found to play important roles in the generation and maintenance of circadian clock. These clocks generate circadian rhythms, which participate in a number of regulatory pathways. Disruption of the circadian signals seems to be associated with the development and the progression of tumours including colorectal cancer. We investigated therefore whether the diurnal profiles of miRNAs linked to tumorigenesis and regulation of circadian clock are changed during tumorigenesis. Based on published data we chose 10 microRNAs linked to tumorigenesis or circadian clock (let-7b-5p, miR 1 3p, miR 106b 5p, miR 141 3p, miR 191 5p, miR 20a 5p, miR 25 3p, miR 29a 3p, miR 34a 5p and miR 93 5p) and compared their 24-hr expression profiles in healthy and in chemically induces primary colorectal tumours of 52week-old mice. Using RT-qPCR we proved circadian rhythmicity in let-7b-5p, miR 106b 5p, miR 141 3p, miR 191 5p, miR 20a 5p, miR 25 3p, miR 29a 3p and miR 93 5p in healthy colon but not in tumours. The acrophases of miR 106b 5p, miR 141 3p, miR 191 5p, miR 20a 5p, miR 25 3p and miR 93 5p were reached around CT 24, the acrophases of let-7b-5p and miR-29a-3p were slightly shifted and reached around CT 21. In summary, our results show that circadian regulation of some colonic microRNAs is greatly affected by neoplastic transformation.

Keywords : circadian rhythm, colon, colorectal cancer, microRNA, tumorigenesis
Conference Title : ICCTB 2018 : International Conference on Chronobiology, Time and Biology
Conference Location : Paris, France
Conference Dates : November 08-09, 2018