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Reverse-expression of aging-related biomarkers by transfection of regulatory molecules via circulating system

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Molecular changes during aging have been studied to understand the mechanism of aging progress. Herein, changes in miRNA expression in the whole blood and exosomes of mice were studied to systemically reverse aging and propose as non-invasive biomarkers. Through next generation sequencing analysis, we have selected 27 differentially expressed miRNAs in whole blood of mice during aging. The most recognized function involved was liver steatosis, a type of Non-Alcoholic Fatty Liver Disease (NAFLD). Among 27 miRNAs, six were predicted to be involved in NAFLD, miR-16-5p, miR-17-5p, miR-21a-5p, miR-30c-5p, miR-103-3p, and miR-130a-3p. The expression of the genes associated in the network of these miRNAs, Bcl2, Ppara, E2f1, E2f2, Akt, Ccnd1 and Smad2/3, was also altered in the liver of aged mice. Following transfection of these miRNAs into old mice, levels of transfected miRNAs in liver increased and expression of Mre11a, p16INK4a and Mtor, reported to be aging-associated molecules, was also reversed in the livers. In case of exosomal transfection from young to old mice, similar results were obtained. The identified molecules in whole blood and exosome might induce a reverse-regulation of aging-associated pathways. This study provides preliminary data on reverse-aging, which could be applied further for treatments of adult diseases.

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Biography

Eunjoo Kim is a PhD in Environmental Toxicology and presently is a Principal Research Scientist of Companion Diagnostics and Medical Technology Research Group, DGIST. She has her BS and MS in Biochemistry at Yonsei University and PhD in Environmental Toxicology at Seoul National University, Republic of Korea. Her research currently focus on the circulating biomarkers and nanomedicine, especially for the development of diagnostic and therapeutic tools based on non-invasive biomarkers and nanobiomaterials and also concentrates in developing new types of biomarkers and their detection system for liquid biopsy, such as exomes and circulating tumor cells based on nanobiotechnologies.

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