

UTILIZING SMALL RNA AND PROTEIN EXPRESSION PROFILING IN THE DETECTION OF PERSONALIZED REGENERATIVE CAPACITIES

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Physical training is a challenge to the whole-body homeostasis, preferably leading to improvements in performance and health. Responses in our systems to exercise load are undeniably complex, and influenced by environmental and genetic factors. A critical element for repeated physical performance is our capability for rapid regeneration, most likely individual specific. In this study, our goal was to reveal novel small molecules, such as micro RNAs, capable of enhancing positive physical regeneration in males.

In our screen, we collected plasma samples from three willfully volunteered subjects, who participated in a 40 km running competition. Specimens were collected prior to, directly after, one-hour after balneotherapy and one day following physical stress. Whole mRNA was isolated and miRNA expression profile was determined using NG sequencing. Protein alterations were detected via 2D gel electrophoresis. Fold changes between certain conditions were calculated by statistical testing.

Our results revealed significant alterations regarding numerous miRNA and miR-related protein targets of various biological processes and molecular functions prior to and following exercise, including resting. miRNA heat map analyses clearly demonstrated, significant initial age-related miRNA differences among the volunteers became equalized one day following the physical load. Moreover, our data revealed, one hour of balneotherapy following physical exercise may prove beneficial in enhancing regeneration.

Our investigations suggest utilizing miRNA profiling prior to and following physical load may reveal novel marker molecules, which sensitively detect and state the physiological conditions and regenerative capacities of our body in a uniquely personalized fashion.

Keywords: Physical exercise, miRNA profiling, Regeneration, Personalized training

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