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Evaluation of epigenetic age acceleration in Growth Hormone (GH)-deficient children after 6 months of recombinant human GH replacement therapy: anti-ageing GH vs. pro-ageing Insulin-like Growth Factor 1 (IGF-1)?

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Background: One of the most debated topics in experimental and clinical endocrinology is the impact of hypo- and hyper-somatotropism on the extension/shortening of the lifespan, the results of experimental, clinical, and epidemiological studies being extremely conflicting. Biological age, a surrogate of lifespan, can be measured through different methods, including the age-related epigenetic modifications of DNA.

Objective: The present study aimed to evaluate the biological (epigenetic) age and age acceleration in a group of growth hormone (GH)-deficient (GHD) children (F/M = 5/5; age: 11.0 ± 2.7 years), treated with recombinant human GH (rhGH) for 6 months at a daily dose of 0.025–0.035 mg/kg.

Results: Treatment with rhGH significantly increased height velocity and circulating insulin-like growth factor 1 (IGF-1) levels. Biological and chronological ages were significantly correlated at baseline and aftern6 months of rhGH replacement therapy. Treatment with rhGH reduced age acceleration, an effect that became significant only after adjustment for IGF-1. In a linear regression model for longitudinal data, after adjustment for rhGH treatment, age acceleration was significantly associated with IGF-1 levels, an effect missing when considering the interaction rhGH treatment × age acceleration at 6 months of rhGH treatment.

Conclusions: (rh)GH, when administered to GHD children, exerts anti-ageing effects, which become evident after removal of the presumably pro-ageing effects of IGF-1.