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Efficiency comparison between vectors containing the genomic or complementary DNA sequences of human growth hormone in an animal model of gene therapy

Enio Aparecido Zacarias, Alissandra de Moura Gomes, Gustavo Protasio Pacheco de Jesus, Vanessa de Luna Yosidaki, Paolo Bartolini and **Cibele Nunes Peroni**
Nuclear and Energy Research Institute, IPEN-CNEN/SP, Brazil

Our group has been working with gene therapy models for growth hormone deficiency. We are using an in vivo approach in which expression vectors containing the growth hormone (GH) gene are administered in mice, followed by electrotransference. In previous studies, elevated levels of human GH (hGH) in mice serum (~20 ng/mL) and high growth approximation to normal mice (catch-up growth) of ~70% for body weight and of ~80% for femur length were obtained, using a plasmid containing the genomic sequence (gDNA) of GH with the ubiquitin-C promoter. On the other hand, we had an indication that the complementary sequence (cDNA) may have an advantage over gDNA in gene therapy protocols. Our objective is to carry out a comparative study between vectors containing the hGH gDNA or cDNA sequences. First, the two vectors were analyzed for in vitro expression levels by transfecting HEK-293 cells. Expression levels reached 250+50 ng hGH/mL for gDNA and 20+9.4 ng hGH/mL for cDNA transfected cells. Although in vitro expression of cDNA-containing vector was lower than that containing gDNA, we believe the cDNA vector may have better expression in vivo, due to a possible better incorporation by the muscle cells in electrotransference. Then, bioassays will be performed administering these vectors into dwarf mice, via electrotransference in the muscle. This will verify the expression profile of GH in vivo, concerning levels and durability, as well as body weight, total body, tail and femur length, mouse insulin-like growth factor-1 levels and catch-up growth.

Biography

Enio Aparecido Zacarias obtained his Biology degree from the Paulista University (2015) and is now a Post-graduate student (MS) at the Biotechnology Center of the Nuclear and Energy Research Institute, located in the University of São Paulo Campus.

eniozacarias@usp.br
bio_enio@hotmail.com

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