Goats as Bioreactors for the Production of Human Granulocyte Colony Stimulating Factor (hG-CSF)

Freitas VJF1*, Melo LM1, Teixeira DIA1, Andreeva LE2, Serova IA3 and Serov OL3

1Veterinary School, State University of Ceará, Fortaleza, Brazil
2Institute of Cytology and Genetics, Russian Academy of Sciences, Novosibirsk, Russia
3Institute of Molecular Genetics, Russian Academy of Sciences, Moscow, Russia

*Corresponding author: Freitas VJF, Veterinary School, State University of Ceará, Fortaleza, Brazil, Tel: +85-31019861; E-mail: vicente.freitas@uece.br

Rec Date: November 03, 2014, Acc date: November 03, 2014, Pub date: November 05, 2014

Copyright: © 2014 Freitas VJF, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Description

The production of recombinant human proteins with pharmaceutical uses in the milk of transgenic animals is sometimes referred to as “gene pharming”. This technology can overcome the limitations facing traditional recombinant pharmaceutical protein production systems. The mammary gland is the preferred protein production site, due to the quantities of protein that can be produced. Based on a partnership with colleagues from the Russian Academy of Sciences, which had already obtained transgenic mice for hG-CSF [1], the idea was to use the same DNA construct for the production of transgenic goats secreting this recombinant protein into its milk. After DNA microinjection of in vivo produced pronuclear embryos was performed, two founders were obtained: one male and one female, named 10 M and 12 F, respectively [2].

Figure 1: Steps for the production of transgenic goats: presumptive zygotes recovered by laparotomy (A), pronuclear microinjection of the DNA construct (B) and founder transgenic goat (C). Photographs were made by L.E. Andreeva (A and B) and V.J.F. Freitas (C).

The mean level of hG-CSF secreted in the milk from the 12 F goat, which was measured during a period of induced lactation, was in average 620 μg/mL [3]. In conclusion, it was possible to produced two transgenic goats (Figure 1) with a stably integrated hG-CSF gene that were capable of secreting recombinant hG-CSF from the lactating mammary gland without causing any harm to the animals’ health.

References