Cloning and Transgenesis

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

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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].

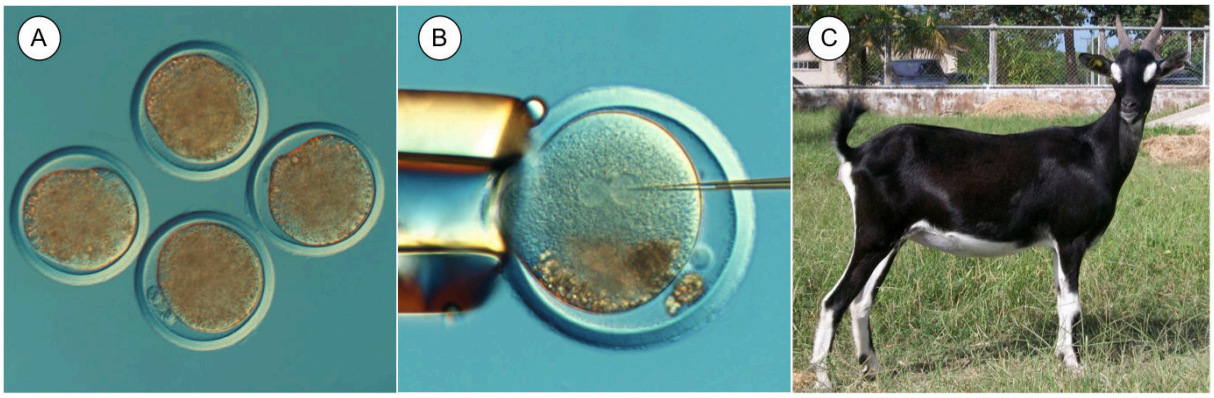

Figure 1: Steps for the production of transgenic goats: presumptive zygotes recovered by laparotomy (A), pronuclear microinjection of the DNA construct (B) and founder transgenic goat (C). Photographs were made by L.E. Andreeva (A and B) and V.J.F. Freitas (C).

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

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