Improving Human and Animal Health with Protein Engineering

Novel High Affinity and Long-Acting Recombinant Bovine FSH Analogs for Veterinary Superovulation

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This work was supported by FDA SBIR Grant 1R43FD004417-01 to MWS and BDW

Investigation was performed with the support and direction from Bruce D. Weintraub, MD, PhD.

Abstract

Superovulation with recombinant FSH analogs is a standard procedure in livestock to produce high-quality embryos which can be used for assisted reproduction techniques. In this study, we have designed, produced, and characterized novel high affinity and long-acting analogs of bovine FSH, which are expected to improve the efficiency, convenience, and safety of superovulation.

Introduction

Bovine ovarian superovulation is the current state-of-the-art method employed worldwide to maintain and improve milk and beef production through genetic selection of the best quality donor cows and best quality transferable embryos. These embryos may either be transferred fresh or frozen both to local recipient cows as well as conveniently shipped to any international locales. The current international market for superovulation is about $20 million per year but with an increase in both population and worldwide food shortages, the growth of new markets is expected (2, 3).

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Design & Methods

Results

Table 1. Development of novel highly efficient production, purification and characterization methods for FSH analog TR55601 from transiently or stably transfected CHO cells. Comparison of 4 different production lots of the new TR55601 analog. In contrast to previous experiments with a human TR4401, we have found that TR55601 analog is more difficult to produce completely. Certain conditions and/or certain cells (Lot 2 and 3) resulted in a product with both poor terminal purification and characterisation by low-grade FSH (LGF) and pharmaceutic applications (PPA) assay (Figs. 2 and 3).

Table 2. Superovulation with single or split-dose singles of TR55601 (FSH) in dairy cows. Fractions of the dose for the first day were given in three daily doses (mg* based on highly impure NIH-FSH-P1 Reference Standard).

Summary & Conclusion

There was a significantly higher proportion of pregnancy rates in the group receiving a single injection of the new long-acting bovine FSH superagonist with an alleviation of the intraspecies bovine superovulation reaching levels of efficacy and safety of comparable levels of terminal superovulation. The novel long-acting FSH superagonist TR55601 showed significantly higher efficacy than previously reported bovine gonadotropins, which were less effective and/or had a greater safety risk. The novel long-acting bovine FSH superagonist TR55601 demonstrated significantly improved pregnancy rates and a greater safety risk compared to previous bovine gonadotropins.

Acknowledgments

This study was supported by the National Institute of Health (NIH) and the Food and Drug Administration (FDA). Clinical studies were performed at the Institute of Reproduction in Cordoba, Argentina by Drs. Gabriel Bo, Dr. Garcia, and Dr. Wolf. The results of these studies were published in the journal Fertility and Sterility in 2010.

References


Further Information

For more information about this study, please contact Dr. Mariusz W. Szukulinski at mws@trophogen.com.

Trophogen is currently recruiting additional Veterinary Centers to participate in Clinical Trials, as well as new partners and veterinary products distributors - please contact Dr. V. Wolf at vwolf@trophogen.com.