



Heat Shock Proteins Are Associated with Reproductive Performance in Cattle

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WARF: P110329US02

Inventors: Hasan Khatib

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing novel SNPs from heat shock proteins that are associated with fertility and embryonic survival in dairy cattle.

Overview

Reproductive performance in high-producing dairy cows is declining. Fertility and embryonic survival are affected by many environmental factors that can stress an animal, decreasing the chance of conceiving and carrying an offspring to term. Genetic factors also affect fertility and embryo survival.

A UW-Madison researcher previously identified several single nucleotide polymorphism (SNPs) that are associated with fertility and early embryo death in dairy cattle (see WARF reference numbers P06197US, P08266US, P09013US02 and P090413US02). Identification of more genes associated with reproduction traits is needed to facilitate genetic testing of cattle to enable quick and accurate evaluation of fertility and embryo survival rate.

Heat shock proteins (HSPs) are among the first proteins produced during embryonic development and are crucial to cell function. Although HSPs have been studied extensively in humans and mice, little information is available on the roles of these proteins in bovine embryos.

The Invention

Using an *in vitro* fertilization system, the UW-Madison researcher now has identified a set of two SNPs of heat shock proteins that are positively associated with fertilization rate and embryonic survival. These SNPs can be used to identify cattle with superior reproductive traits for breeding.

Applications

- Dairy cattle breeding to improve fertility and embryo survival

Key Benefits

- Provides additional genetic tools for use in selective cattle breeding to enhance fertility rate and embryonic development
- Useful as a breeding tool in enabling selection decisions to be made earlier than in traditional breeding programs, thereby shortening the generation interval for cattle breeding
- DNA markers are easy to measure, unambiguous and co-dominant.

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For More Information About the Inventors

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Related Technologies

- [WARF reference number P06197US describes the first reported gene, *STAT5*, to affect embryo survival in mammals.](#)
- [WARF reference number P08266US describes a SNP in the *FGF2* gene that is highly correlated with embryonic survival.](#)
- [WARF reference number P09013US02 describes a panel of SNPs from the interferon- \$\tau\$ pathway that is associated with fertility and embryo survival in cattle.](#)
- [WARF reference number P090413US02 describes a novel SNP from the *PGR* gene that is associated with fertilization rate and embryonic survival.](#)

Publications

- Zhang B., Peñagaricano F., Driver A., Chen H. and Khatib H. 2011. Differential Expression of Heat Shock Protein Genes and Their Splice Variants in Bovine Preimplantation Embryos. J. Dairy. Sci. 94, 4174-4182.

Tech Fields

- [Animals, Agriculture & Food : Animal biotech](#)

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