charles river

GENETICALLY ENGINEERED MODELS

Line Rescue Services

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- Charles River can help determine underlying problems and provide solutions for unexpected breeding difficulties.
- Breeding difficulties can be due to age, obesity, or other phenotypes.
- IVF is our primary rescue method.
- Services are designed to boost fertility and generate offspring.

Determining the Cause

Prior to initiating any rescue procedure, Charles River performs a comprehensive fertility assessment on each line. This aids in identifying the root cause of the breeding problem and helps determine the best route for overcoming the lack of production. Analysis of past reproductive records, background of the model, and age and condition of the available animals is performed as a first step. Depending on the results, additional information may be obtained through computerized sperm analysis, oocyte collection, observational mating, and ultrasound imaging. Combined, these rescue techniques help facilitate the continuation of our clients' valuable genetically engineered models.

Solutions

Once the cause of the reproductive difficulty has been determined and its severity assessed, we can apply the most appropriate rescue technique and recover viable offspring. The most commonly used procedures are outlined below.

Ovarian Transplantation

Ovarian transplantation can provide a means of rescuing valuable females that are either not capable of carrying a litter to term or are unable to breed due to age or poor body condition. This procedure can also be used as a tool in the maintenance of difficult lines in which the female is unable or unwilling to nurse her pups, thus necessitating the need for cross-fostering and maintenance of a foster colony. Adult ovaries can be transplanted to histocompatible or immunodeficient recipients. Further, donor ovaries can be split in half or quartered allowing for additional transplants. Briefly, ovaries of the recipient female are removed by making a small slit in the ovarian bursal membrane. The stalk between the ovary and oviduct is cut and the ovary is removed. The donor ovary is inserted into the opening in the bursa where it is physically held in place. Within a few weeks, the blood supply to the ovary will be re-established and the ovary should begin to function normally.

Laser-Assisted IVF

A main criterion to successful IVF is the use of sperm with acceptable mobility, concentration, and forward movement. If one or more of these parameters is suboptimal, the ability to fertilize oocytes can be severely limited. For these cases where traditional IVF would not be successful due to low-quality sperm, laser-assisted IVF is utilized to increase fertilization rates and ultimately increase the number of live offspring returned. For this procedure, a XYClone® laser is used to provide a means for less progressive sperm to penetrate the oocyte and induce fertilization. This technique has greatly enhanced the fertilization efficiency of many genetically engineered lines and is a vital tool in the rescue of valuable strains.