

FACT SHEET

Cloning

Thank you for your enquiry about cloning.

We have successfully completed two seasons of cloning and are now providing access to the cloning technique.

What is cloning?

Somatic cell nuclear transfer or 'cloning' as it is more commonly known, is the process by which the nucleus of a mare's egg is replaced with the nucleus of the horse to be cloned using a micro-manipulator.

Once inserted into the donor egg, the nucleus of the mare to be cloned binds to its host and following a period of approximately one week in an incubator, any embryo is produced that grows into a genetic replica of the horse from which the replacement nucleus was taken.



Will the clone have the same ability as the original?

The clone will be born with the physical capability as the original horse and combined with the appropriate environmental factors throughout its training, the clone will perform as well as the original horse.

Naturally, variances in training, social experiences and the evolution of the sporting discipline that the horse competes (e.g. course evolution, rider ability) will impact heavily on the sporting success of the clone.

Such an impact may be either positive or negative and will depend on the specific circumstances. For example, where the original horse changes discipline during its career, the clone's earlier exposure to the discipline for which the original horse succeeded may lend the clone an opportunity to exceed the success of the original. Likewise, a trainer's learning from the experience with the original horse may allow missteps to be eliminated from the clone's development.

Will the clone's appearance be the same as the original horse?

Yes, though you should expect small variances. The clone's base colour will be the same as the original horse and markings such as a blaze or coloured socks will carry from the original to the clone. That being said, many markings on the clone will vary slightly to the original, such as, the design of the blaze or the length of the sock.

As depicted below in a clone born recently at Catalina, the original horse appears chestnut with a white star whilst the clone is chestnut with an elongated star that is more pronounced:



That being said, we have also foaled clones that appear identical to the original horse such as this example:





What are the benefits of cloning?

As breeders ourselves, it's important to state here that the single act of cloning in isolation will not improve your particular breed. What cloning does achieve as a tool amongst various breeding strategies is:

ACCIDENT OR ILLNESS

Unfortunately, from time to time, horses are injured or suffer irreparable complications such as cholic and they can't be saved. Where this occurs early in the horse's life, the loss of future possibilities through breeding or competition can be very difficult.

Thankfully, cloning enables you to reengage with the various future possibilities by bringing back the genetics potential of the original horse in the form of the clone.

TALENTED GELDINGS

Boys being boys, the early signs of greatness may be hidden in the precocious body of a misbehaving colt. Once gelded, the temperament may become manageable though the breeding potential is erased.

Upon returning, your clone will be entire and his future breeding potential will come alive.

SALE OPPORTUNITY

For many breeders, the opportunity to sell a talented horse underpins the business plan and despite the potential of the horse, for the right offer, the horse will be sold. The corollary to this is that genetics are lost and the ability to improve the breed is exchanged for much needed funds.

By taking a biopsy to clone your talented horse prior to sale, you have the opportunity to re-invest the proceeds of sale to produce the clone and secure the future breeding potential that would otherwise be lost.

AGED MARE OR STALLION

Not all talent is identified early and often, the demands of a competition schedule do not allow for the opportunity to breed from a mare or stallion as often as you would like.

Once cloned, the future breeding potential of the aged mare or stallion can be extended and the possibilities that were once narrowed by a busy schedule are again, wide open.

What is involved?

There are 4 main steps:

1 TAKING THE BIOPSY

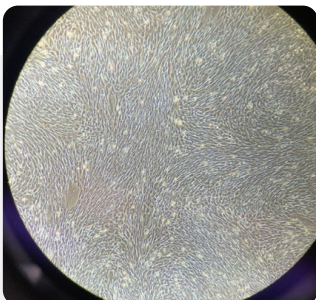
Your vet will take a skin biopsy approximately the size of a green pea from the middle of the horse's neck, near the mane. The incision is made under light sedation and closed with a single stitch. Most horses are able to continue light work over the course of 2-3 days, prior to returning to usual activity.

The biopsy is placed in a tube with preservation fluid provided by Catalina and transported to our facility in Sydney, Australia. Biopsies may be taken from horses located anywhere around the world for cloning in Australia.

2 CULTURING THE CELLS

Once the biopsies are returned to our facility, a process is performed to culture the cells located within the biopsy and grown to create a colony of healthy cells, living in a sterile, contaminant free environment.

The cells are then vitrified and stored at -190 degrees celsius in one of our various liquid nitrogen tanks. Once stored, the cells will survive for an indefinite period and may be used to produce a practically limitless number of clones.



3 MAKING THE CLONED EMBRYO



Once we are ready to produce a cloned embryo, the cells are thawed and placed in a dish adjacent a donor egg under a micro-manipulator.

The nucleus of the donor egg is then removed and replaced by the cell of your original horse.

We apply a binding protocol and place the donor egg in an incubator for approximately one week, during which time, the cells of your original horse bind to the donor egg to create a cloned embryo that is either ready for transfer or vitrification for later use.

4 TRANSFER OF THE CLONED EMBRYO

Once the embryo cloning process is complete, the embryo may be thawed from vitrification at any time in the future or transferred immediately.

During the transfer process, a suitable recipient mare is identified, the embryo transferred and the usual equine gestation period of 11 months is applied.

