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Cloning success

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Several different animals have been cloned since Dolly the sheep, and Utah State University will forever be associated with cloning the first mule.

Well, the first three mules — each born roughly a month apart.

Though five years have passed, Kenneth White fondly remembers tirelessly working in the lab, trying to figure out the right conditions to yield a successful clone of a mule — the typically sterile offspring of a donkey and a horse.

“This was a defining moment for me as a scientist because it was very satisfying to have the ability to be able to figure this out,” said White, a USU professor, who also chairs the Department of Animal, Dairy and Veterinary Sciences.

But the cloned mules that now travel the country on the racing circuit didn't always have such a bright outlook. After all, White and his research team — composed of a few other professors from the University of Idaho — inserted 113 eggs into various mares before getting a successful clone.

There was, of course, a lot of trial and error.

“From our standpoint, we felt like working with the mule was so much more difficult because with most of the species that had been done ... you probably had the least amount known about that particular species in the areas you need to know about to be successful,” White said.

The big breakthrough to get the cloned embryo dividing came in figuring how horse eggs regulate calcium.

“When we learned that and we changed the surrounding environment of these eggs to dramatically increase the calcium that they were bathed in, that made all the difference,” said White.

No sperm cells were used in cloning the mules. Instead, White's team took an unfertilized egg from the mare and removed its nucleus, then transferred the nucleus of a differentiated cell from the mule into the egg cell, while fusing the two cells together. Under the right conditions, such as the proper levels of calcium, the mechanically fertilized embryo began to divide.

Next year, more mares are scheduled to give birth to cloned mules — including a clone from one of the original cloned male mules and another female clone.

White noted that animal cloning has existed since at least the early 1980s. Prior to Dolly, researchers used embryonic undifferentiated cells, or ones that have the potential to become any type of cell in the body. Since Dolly was cloned in 1997 by using differentiated cells — ones that are representative of specific tissues — scholars have shifted to that method.

But White's team was the first in the world to clone any type of equine.

In addition to mules, White also does a lot of cloning work with cattle. He and a colleague recently received a



Ken White and Ben Sessions work in the lab in the Center for Integrated Biosystems at USU on Thursday. (Meegan M. Reid/Herald Journal)

\$1.2 million grant from the National Institutes of Health to study placental problems in cloned cattle with the hope of learning insights into placental insufficiency in humans, which results in pregnancies being lost prematurely.

“As far as applying (cloning) to animals, there’s absolutely no ethical concerns for me because there’s many very good and justified reasons for using this,” said White, referring to the placental research as an example.

Cloning in animals frequently results in problems or “losses” during gestation, White said. He believes that’s one reason why cloning in humans isn’t currently “acceptable from a societal standpoint.”

But he’s not opposed to revisiting the issue.

“From a practical standpoint, real progress has to be made in understanding why those problems occur and potentially alleviating them in the animal models before you think about applying it to humans,” White said. “This is an issue where society has to look at it periodically ... to see the risk of problems and then make the decision at that point whether it’s acceptable now or in the future. I think right now, it’s not acceptable, but I’m not going to lock the door and throw away the key.”

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