

## Man-like pony hearts used for UNL study

In the surgery room of UNL's Basic Veterinary Science complex, veterinary physiologist James Amend performs open-heart surgery on his patient — who lies on a hydraulic lift. A no-pest strip hangs overhead. His patient is a pony.

The operation is a "sham experiment" — part of the pony heart research Amend has been conducting since his graduate studies 15 years ago at the Baylor Medical Center. Amend said research shows that the microvessels of the pony heart resemble human hearts closely.

Amend said researchers prefer dog and pig hearts for studies, claiming they more closely resemble the human heart.

"There has been a great deal of argument about the usefulness of the dog and also the pig as experimental models for coronary heart research in man," Amend said.

Amend said a dog's heart is the poorest example of the three because it doesn't have the microvessel distribution the other two have. The anatomical supply of the main arteries is the same in both the pig and pony, he said.

Pony and human hearts have two similarities that dog and pig hearts don't, Amend said.

"The dog and the pig tend to have more of their small coronary vessels in the outer layers furthest from the heart muscle and the heart chambers, whereas the pony has more of its small vessels concentrated in the inner layers, closer to the ventricular chamber of the heart," Amend said.

Amend's study includes mapping the patterns of the heart's vessels, taking photographs of them, and studying the vessel patterns under the microscope.

Researchers also are looking at the major vessel along the front of the heart, Amend said. This vessel supplies most of the left side of the heart muscle and often is involved in the most dan-

gerous form of human heart attacks, he said.

Amend discovered the similarities between pony and human hearts while he was researching at the University of Missouri. He continued that work at UNL.

What we want to do first is to characterize the basic anatomy of the large, small and even microscopic vessels of the pony coronary arteries, comparing those to dog and pig arteries and then to the literature concerning the anatomy in man," he said.

"We hope that we can develop this model to the point where it's a convincing model, where its benefits over and above the other species are clear," Amend said.

Amend said he also hopes to go federal agencies such as the National Institute of Health and tell them of the "better mouse trap; the better model to study heart disease and do heart research."

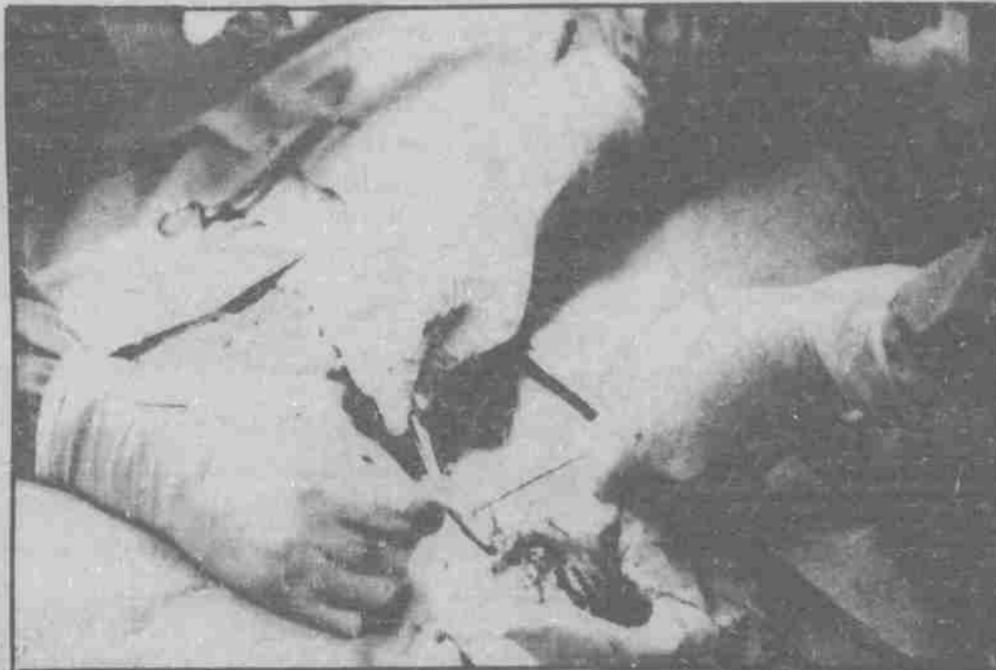
Amend said he has received money from the NU Research Council for biomedical research and from the National Institute of Health.

Although the research usually ends in the death of the pony, Amend said, an "astute livestock person" has been hired to buy ponies that are clearly undesirable for other purposes — ponies that are lame or have temper problems. The entire surgical process is not painful, he said.

About 45 minutes after the operation, the pony is usually on his feet, he said. In another 45 minutes, the animal is back in its stall. About two hours after the operation the animal is eating.

Amend said he hopes to perform chest surgery successfully by the end of next year.

"We want to implant devices that will stimulate heart attacks for study, and we hope our mapping process will confirm that we have a heart with a set of coronary arteries that are more similar to man's than the pig and dog."



Upper right: James Amend sutures the incision with help from Amy Valentine. Right: Mike Trammer checks the pony's eye reflexes to determine how anesthetized the animal is. Above: Open heart surgery is performed. Lower right: Valentine and Chris Oltman walk the pony back to its stall less than two hours after the operation.



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