

**Application for a Price Chair Teaching Improvement Grant: Spring 2004**  
**by Joseph Ottobre, Professor, Animal Sciences**

**Title:** A New Approach to Teaching Reproductive Anatomy

**Description of the idea**

I teach reproductive anatomy in my Reproductive Physiology course, Animal Sciences 610. Pictures and diagrams are very helpful to teach anatomy, but for students to completely understand and recognize the various reproductive structures and their anatomical arrangements, it is essential to use specimens acquired from animals. Using such specimens for teaching provides a hands-on experience that gives students an opportunity to visualize the reproductive organs in three dimensions. This active experience improves their memory and understanding of what reproductive tissues look like, and helps the students visualize how these tissues are arranged. An understanding of reproductive anatomy, and the differences among species, is of fundamental importance in comprehending the physiology of the various reproductive systems. Students appreciate the anatomy labs in Anim Sci 610 very much, and they often comment on the high value of these labs as a learning tool.

Female reproductive tracts from prepubertal cows, sheep, and pigs are fairly easy to obtain at the slaughterhouse. They are inexpensive to purchase, and they can be stored frozen. They are thawed for laboratory study and discarded when no longer useful. My problem is that **intact** male tracts, tracts from mature females, and male and female tracts from non-production species are difficult to acquire at the slaughterhouse or veterinary clinics. Most males that are harvested have been castrated. Castrated animals have limited use for teaching reproductive anatomy. Not only are the testes unavailable in castrates, but since the accessory sex glands depend on testes products for their support, they are highly regressed in castrated males. Mature females are used for breeding purposes, and they represent a limited proportion of the animals that are available in the slaughterhouse.

I would like to request support to prepare some key anatomical specimens for long-term use. The College of Veterinary Medicine at Ohio State provides a service to preserve biological specimens using a process known as plastination. This service is available for a fee. The plastination process transforms biological specimens into a plastic-like material. Following plastination, the specimens are very realistic in appearance, are preserved indefinitely at room temperature, and are not preserved in a noxious and offensive solution. The plastinated specimens are readily available for study of the three dimensional arrangement of organ systems in most settings. Such specimens would greatly augment the study of anatomy by students.

**Description of the course/courses enhanced**

Plastinated reproductive tracts could be used in various courses that we teach (e.g., Reproductive Physiology, Animal Sciences 200, management courses, etc.). These specimens would represent a rich resource to supplement the standard textbooks. In addition, such specimens would be useful for

workshops for new undergraduate recruits, other guests, or for other forms of outreach education. Plastinated specimens are very durable, and I anticipate that they would last for many years.

To facilitate the use of these specimens by other faculty and graduate students, who perhaps do not specialize in reproductive physiology, I intend to develop instructional guides to accompany each plastinated specimen. These guides will include labeled diagrams and/or pictures to help with identification of the functional components of the reproductive tract. In addition, the guides will include notes on the role of each anatomical part in physiological processes.

### **Progress to date**

I have obtained some funds to initiate this project through other channels. As such, I have begun to work on collection of specimens. So far, we have collected reproductive tracts from a boar, a ram, a female dog, a mature cow, and two male dogs (one with pelvis intact). These tracts are preserved and are ready to undergo the plastination process.

### **Plans of action (procedures)**

#### **Acquisition of reproductive tracts**

I will be able to acquire male reproductive tracts from the production species at minimal cost by working with Dr. Henry Zerby in his animal harvesting facility. This is how I acquired the boar tract. I am also working with Dr. Cynthia Johnson, a former PhD student of mine, who is currently a student in Veterinary Medicine. She is helping me acquire tracts from animals used in teaching. This is how I acquired the dog tracts. In addition, Dr. Johnson is able to obtain some specimens from the necropsy/pathology unit. This is how I acquired the tracts from the cow and the ram.

### **Faculty Development**

Once the source of a reproductive tract is identified, I must dissect and isolate the specimen. This process of dissection and isolation of the reproductive tissues is important in my development as a teacher of reproductive anatomy. I have found that since initiating this project, I am augmenting my understanding of reproductive anatomy. To collect the structures, one must work carefully to remove them from their attachments in the animal in order to maintain the integrity of each important component.

During this process, I am improving my knowledge of exact locations of structures and how they are supported within the live animal. Thus, funding of this application will help me gain a more thorough understanding of reproductive anatomy in a variety of species. This is a valuable component of my ability to put together effective teaching guides that will accompany each specimen.

As mentioned, plastinated specimens and accompanying study guides will be available for faculty members and graduate students that teach other courses, such as management courses, other physiology courses, introductory courses, etc. These specimens plus guides will serve to augment the development of these faculty members and their ability to teach reproductive anatomy and physiology.

## **Timeline**

I mentioned, we are already in the process of acquiring reproductive tracts. I have made contact with Dr. Jerry Masty of the College of Veterinary Medicine to begin the plastination process. This process will take several months for each specimen, although multiple specimens can be plastinated at the same time. I anticipate that we can acquire and prepare the reproductive tracts of interest over a period of one to two years.

## **Budget; amount and use of funds and prioritization**

We intend to use the funds that we recently acquired to plastinate the specimens that we have already collected (boar, ram, female dog, mature cow, and two male dogs). Additionally, we would like to make the following tracts our highest priority: bull, stallion, and mare. Since we are putting more emphasis on companion animals in the department, and since these specimens are also difficult to acquire, it would be excellent to have the funds to cover plastination of tracts collected from male and female cats as well.

**Budget request**

**Estimates for plastination of reproductive tracts**

<b>Source of Reproductive Tract</b>	<b>Estimated cost of plastination</b>
Bull	\$1000
Mature Cow	\$1000
Stallion	\$1000
Mare	\$1000
Ram	\$800
Mature Ewe	\$800
Boar	\$800
Transverse penile sections (all four males above)	\$400
Male Dog X 2 (one with pelvis intact)	\$1000
Female Dog	\$500
Male Cat	\$400
Female Cat	\$400

Total Estimated Cost	\$9100
Minus funding already obtained	-\$4100
<b>Total requested from Price Chair Grant</b>	<b>\$5000</b>

**Joseph Ottobre, Professor** \_\_\_\_\_

**James Kinder, Chair** \_\_\_\_\_

**Department of Animal Sciences  
Ohio State University**