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11/12/2010

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**RE: Nord Grant Proposal**

Dear Committee Members,

I teach a graduate course in Human Embryology (ANAT 491: established through a Glennan Fellowship), as well as embryology in the medical and dental school curriculums. The lectures cover diverse topics concerning embryological and fetal development. All of the topics require a basic understanding of embryonic and fetal developmental staging, which is accomplished through the comparison of available images of whole or sectioned specimens with standard Carnegie Stages, gestational age atlases, or clinical staging.

Over the years, I have found that students examining actual human embryonic and fetal specimens gain insight into the timing of developmental processes and the ability to judge staging criteria. During the early days of the Department of Anatomy, as with many other institutions, human embryological and fetal specimens were collected, characterized and used in teaching and research. Approximately 35 specimens are present in the department ranging from mid-embryological stages to late gestation, and are housed in a variety of jars and questionable media. The original data pertaining to these specimens has been lost over time. It is thought that some of these specimens were collected by Thomas Todd, Professor of Anatomy 1912-1938, who also established the Hamann-Todd osteological collection at the Cleveland Museum of Natural History. The collection of human embryological specimens, while robust in the late 1800s and the first half of the 20th century, has become to be considered a liability. For this reason, many collections across the country have been destroyed or consolidated into national collections. This proposal allows the preservation and use of the materials as a local resource for faculty and student use in embryological education.

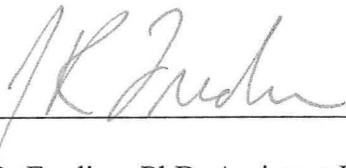
In order for these specimens to be made useful in teaching human embryology and for student use, they must be re-staged, characterized and properly mounted. Developmental staging requires a careful examination of the characteristics of each embryo, and a comparison of those characteristics with those of a standardized staging system (Carnegie). The embryos and associated non-embryonic tissue must be preserved properly, with regard to specimen stabilization and the health hazards of storage media, and displayed using methods that promotes their use in education. The displaying of these embryos will be limited to students and faculty, and requires input from biomedical artists to establish the proper methods of display that will impart the greatest access for study while maintaining the proper respect for the material.

In this proposal, I plan to examine, characterize, and re-mount the specimens that are determined to be usable for education. The specimens will be mounted in clear plastic (perspex) jars using clear plastic rods and discs to suspend the specimens in appropriate context. The proposal calls for the work of an Anatomy graduate student to help in data collection and specimen characterization. In addition, a biomedical art student from the Cleveland Institute of Art will be tasked with creating an appealing and functional method of display. In addition to the specimen characterization and display, Department of Anatomy records, notes of Dr. Todd, and interviews with emeritus faculty and alumni will be collected and examined in an attempt to document the specimens.

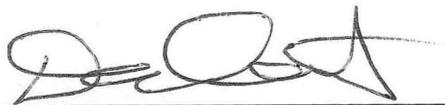
Budget Request

Anatomy Graduate student (120 hrs at \$14/hr)	\$1680
CIA biomedical art student (60 hrs at \$14/hr)	\$840
Museum jars (perspex), mounting materials and storage solutions	\$2500
Collection guide preparation (manual and history)	\$500
Total	\$5520

Thank you for your consideration of this proposal.



John R. Fredieu, PhD Assistant Professor of Anatomy



Daniel B. Ornt, M.D., F.A.C.P Chairman, Department of Anatomy