

Preface

Cell and Tissue Banking



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Guest Editor

Tissue banking has been an obscure and rarely encountered subject for most pathologists until very recently. The previously rare occasion in which a pathologist was called upon to review a potential donor or sign out the surgical pathology of a removed transplant has been supplanted by urgent calls from hospital administrators to centralize tissue services, preferably under the auspices of the blood bank, as a result of the experience with regulations and tracking. Now, many pathologists are being challenged with learning both the scope of cadaveric tissues transplanted within their institutions and the unique requirements for handling and storage of each of the different tissue products. To complicate matters, the number of vendors making sales pitches to our surgeon colleagues is increasing as diverse specialty sales organizations market variants of existing tissue products. New federal regulations (21CFR part 1271) effective May 26, 2005, and Joint Commission on Accreditation of Health care Organizations (JCAHO) Standards (effective July 1, 2005) bring many of the current practices of the pharmaceutical and blood banking industries to the practice of tissue banking.

The reader is invited to enjoy this issue of the *Clinics in Laboratory Medicine* as a broad overview of the use and uses of various tissues from deceased donors in several surgical specialties or to focus on individual articles pertaining to immediate problems or challenges in his or her practice. The articles are complimentary in presenting different unique

tissues from the perspectives of experts in the use or procurement of the specific tissue. The breadth of subjects will be useful to both the novice and more experienced tissue banker.

The overview is presented by Dr. Judith Woll, who brings expertise from the perspective of a medical director of a community tissue bank. This almost encyclopedic review provides a historical framework and excellent foundation for each of the more specialized reviews. Her discussion of the immunology of grafted tissue gives insight into the unique problems encountered (and discussed) with each type of tissue. Dr. Woll provides additional, pointed guidance to the surgeon regarding selection of tissue and communication with the patient, as well as a handy table of tissues and indications for their use.

Wendy Frizzo and I review the evolution of regulatory oversight of tissue banking and provide a summary of current federal and state regulations and voluntary compliance standards. Our hospital blood bank has been handling tissues for 10 years, and Ms. Frizzo has become expert in the complexities of regulations, standards, competing vendors, and aggressive direct marketing. Many of the practices long considered *de rigor* in the transfusion medicine community have been adopted, now by federal regulation, by the tissue banking community.

One hundred thirty years of skin grafting is put into perspective with modern practice and emerging technologies by Kagan, Robb, and Plessinger from the Shriners Burn Center in Cincinnati. The unique biology and immunology of the various forms of skin grafts is demystified. The reader will have a good understanding of the real and theoretical problems of using cultured skin for grafting.

Drs. Gandhi and Strong provide a comprehensive review of the use of tissues derived from the heart and great vessels for transplant, focusing on the recovery, processing, and use of valvular tissues. The science of cryopreservation of these complex tissues is clearly explained, and there is a brief discussion of the controversial use of stem cells for the regeneration of damaged cardiac muscle.

One of the most common transplantations performed is that of the cornea. Mian and Sugar and colleagues, from the University of Michigan W. K. Kellogg Eye Center and the Midwest Eye Banks, respectively, review eye banking legislation, regulation, and surgical practice with the detail expected from a specialty that does so much fine work under a microscope. The extensive detail will well prepare pathologists supporting both the surgeon and the recipient.

The complexity and diversity of bone and connective tissue grafting is reviewed by Drs. Woll and Smith. They compare and contrast frozen and lyophilized bone and explain the physiology of the restructuring of the bone after transplant. This section will probably be referred to most often because of the conflicting information that is presented by salespeople for the different vendors. The foundation provided by Drs. Woll and Smith will aid

in evaluating products from competing vendors, particularly when charges can differ wildly between very similar products.

The unique and potentially controversial area of reproductive tissue banking is well reviewed by Drs. Shah and Keye. They provide an overview of the scope and history of banking of reproductive tissues and provide a thorough explanation of the indications for and procedures involved in obtaining, processing, storing, and using the spectrum of reproductive tissues. The evolving technology in reproductive biology has moved far from the storage of sperm and is making fertility a possibility for individuals who, until recently, were denied that option. Few of us in laboratory medicine encounter these issues or this technology; this will be interesting reading for most pathologists.

One of the most exciting developments in transplantation is the use of isolated pancreatic islet cells for the reconstitution of normal insulin production and regulation. Drs. Nath and Hering from the University of Minnesota Islet Transplant Program explain the biology of islet cells, the mechanics of isolation, and the immunology of transplantation. This rapidly advancing area is put in historical context of the changes in immunosuppression and modern management and treatment of diabetes mellitus.

Drs. Savasan and Abella complete the issue with a concise review of the use of stem cell transplantation in the pediatric setting. The history is shared by all hematopoietic stem cell transplantations and the principles provide an excellent foundation for anyone wishing to learn more about stem cell transplantation, in general. The authors discuss the differences between adult and pediatric stem cell transplantation and explain the reasons that cord blood stem cells have been used with more success in the pediatric patient population than in adults.

I would like to thank the contributors for bringing this project to the printed page. As hospital administrators move to meet JCAHO requirements and vendors work to comply with the new federal regulations, many pathologists and laboratory administrators will be looking for resources to help them understand the “tissue business.” I am confident that this issue of the *Clinics in Laboratory Medicine* will be one of the more accessible and useful issues available.

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