Biobanking and Biopreservation: Engineering Contributions

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Biospecimens are macromolecules (DNA, proteins, etc.), cells, tissues, and bodily fluids that are used for diagnostic, therapeutic, and epidemiologic purposes. Collection and storage of biospecimens have gained such prominence that biobanking was featured in the March 12th, 2009 issue of Time Magazine as one of the “10 Ideas Changing the World Right Now: What’s Next 2009”. Biospecimen procurers and users are separated by gaps, which are typically both physical and temporal. Therefore, the usefulness of a biospecimen is determined in large part by our ability to efficiently preserve the critical biological properties of the biospecimen. Conventional methods of preserving biospecimens were developed in the 1970’s and there has been little evolution in the techniques used to preserve biospecimens in the intervening decades. Recently, the Biopreservation Core Resource (www.biocor.net) was developed at the U of MN. This national resource in biopreservation is designed to advance the science, technology and practice of preservation. Projects designed to elucidate the mechanisms of damage during freezing and develop technology to improve preservation outcomes will be described.

Bio Dr. Hubel is currently Professor of Mechanical Engineering and Director of the Biopreservation Core Resource (BioCoR, www.biocor.net). For almost 20 years, Dr. Hubel has studied both basic science and translational issues behind cell and tissue preservation (liquid storage and cryopreservation). Her research focuses on development of protocols for cell and tissue preservation, development of microfluidic technology to improve preservation, and understanding molecular mechanisms of damage and education/training in the field of preservation. She has published numerous articles related to cell and tissue preservation and has been awarded three patents related to cell preservation technology.