

Introduction

The UCLA Medical Center is located close to many earthquake faults running throughout Southern California, and is just 11 miles from the epicenter of the 1994 6.7 Richter scale Northridge earthquake. In addition to threat of physical damage resulting from shaking forces, secondary water and fire damage as well as loss of freezer power are concerns in the event of an earthquake or other disasters. In response to these concerns, the Brain Tumor Translational Resource (BTTR) at UCLA has developed and implemented some initiatives to minimize loss of biospecimens, tissue derivatives, and electronic data.



Olive View Hospital in Sylmar, CA after the 1971 San Fernando earthquake

Aims and Goals

- To mitigate loss of biospecimens in the event of earthquakes or other natural disasters
- Leveraging technologies that can minimize the primary and secondary effects of earthquakes
- To ensure that electronic data can be recovered in the aftermath of an earthquake.

Preservation of Blocks and Slides



Paraffin Blocks



Tissue Micro Arrays are created as "backups" for important groups of paraffin blocks



Biospecimens and derivatives are dispersed to repositories in different locations



Stained Slides



Stained Slides are scanned and stored as Whole Slide Digital Images (WSDI) that are backed up to a 2nd server

Preservation of Frozen Samples



Important Samples are stored in a -150°C freezer with liquid nitrogen backup.

DNA, RNA & protein are extracted from predicted high-use specimens



DNA & RNA stored in room-temperature stable matrices available from commercial vendors (GenVault, Biomatrix)



Frozen Specimens

Lyophilization is being investigated as a means of long-term room temperature storage

aliquots

Preservation of Electronic Data



Earthquakes may result in the destruction of entire computer servers, networks, and mainframes. As a precaution, basic electronic files are regularly backed up on servers AND onto an encrypted off-line hard drive that is securely stored in a separate building.

Other Considerations

- Paraffin blocks and slides are stored in closed, latched cabinets fastened to wall studs to limit damage from being thrown out of their containers—a major source of glass slide loss at Los Angeles hospitals during the 1994 earthquake.

Summary

Because of the unpredictable nature of earthquakes and other disasters, no number of steps can completely safeguard biospecimens against the forces of nature. Nonetheless, some sensible precautions can be taken to provide a level of protection. In particular, the dispersion of duplicate specimens and electronic data to multiple locations can provide a modicum of assurance that one earthquake will not result in the complete loss of important specimens and/or years worth of research data. Further, less reliance on traditional storage technologies (e.g. freezers, etc) and investigation of novel room temperature storage methods can minimize an earthquake's indirect impact on a biorepository's collection.

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