Factors Affecting Gene Expression (RIN Value) and Tissue Histology in Human Post-mortem Tissues: A Focus on Tissue Sample Quality at Four Different Post Mortem Time Intervals.

Jackson, J1, Rodgers, MS1, Mitchell, C2, Hawley D1, Lloyd, Jr, FP,3 Saller, C4, Howanski, R4 and Sandusky, G1. Dept of Pathology1, Simon Cancer Center2, Indiana University School of Medicine1,2, Marion County Coroner’s Office3, and ABS, Inc4, Indianapolis, Indiana

The traditional markers of postmortem tissue quality have been descriptive with gross and histology analysis and have considered postmortem intervals (PMI), agonal condition, patient age, and disease state. The postmortem neuropathology field has acquired chemical markers for tissue quality, starting with pH, and 28S/18S ratio, and now includes RNA quality determined by RIN values. In this postmortem autopsy study, 10 organ tissues from 4 postmortem cases with different PMI were evaluated. Clinical history, agonal state, and PMI of 10, 12, 16, and >24 hours were evaluated to determine histology and molecular markers of the postmortem tissue. In this study, PMI was not predictive for RNA stability (RIN values). Refrigeration time after death did influence body temperature, delayed postmortem autolysis, and increased RIN values. However, prolonged interval of hypoxemia decreased RIN values. The clinical medical history and agonal state scores were probably the most important variables affecting RIN values. According to the data, the pancreas and small intestine autolysed quickly. The 16 and 24+ PMI cases had greater than 80% autolysis in the pancreas and small intestine compared to the 10 and 12 PMI cases with minimal to moderate autolysis (25-40%). Of the 10 tissues evaluated, the highest average RIN values were heart (7.1), lung (5.9) and skin (5.9). In conclusion, as with previous postmortem brain banking studies, the RIN values in most postmortem tissues, except the GI tract, is highly correlated with medical history and agonal state, but was not greatly influenced by the PMI in this small case study.