

Life After Death: Using Bacterial Diversity to Determine Postmortem Interval

Elise Clancy and Jutta Heller*

In any postmortem analysis, time since death, or postmortem interval (PMI), is the first piece of evidence used to determine cause of death. There is no universally applicable method for PMI determination due to unique circumstances of death. Current methods for determining PMI are costly, labor intensive, and may only be accurate within a range of weeks, posing a barrier to solving homicide and missing persons cases. Because decay is driven by bacterial succession (population growth and species replacement), understanding the bacterial composition during decay can be used as a cost-effective and rapid tool for determining PMI. This review included 18 primary and secondary sources that relied on 16s ribosomal RNA analyses to quantify bacterial diversity in corpses undergoing active decay in both controlled and natural grave sites. The bacterial species that were most revealing in determining PMI included *Clostridium*, *Bacteroides*, and *Proteobacteria*. In many of the published studies, bacterial diversity could be used to estimate PMI within a range of hours to days. Bacterial succession throughout active decay was found to be both predictable and quantifiable, regardless of the circumstances of death and rate of decay. Analysis of bacterial succession has potential to be a universal method of PMI determination because it is quick, reliable, and requires little or no specialized equipment. A rapid and accurate determination of PMI will hasten the process of solving open homicide and missing persons cases.

Word Count: 232