



### E6 A Story of “The Incredible Find,” “That’s Strange,” “The Wolf,” “Smile, You’re on Camera” and Dealing With the Aftermath

*Robert A. Middleberg, PhD\*, National Medical Services, 3701 Welsh Road, Willow Grove, PA 19090*

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As any well-trained scientist learns, the experimental approach is methodical and starts with a hypothesis. Only after the hypothesis is beaten and battered does a thesis appear. Fortunately, as scientific discovery progresses, as techniques become better and more sensitive, as hitherto unrealized information becomes realized, today's thesis can become tomorrow's “I thought so.” In the forensic sciences, we are constantly reminded of this latter principle. Techniques and related data that was state-of-the-art 50 years ago would be considered unacceptable by today's standards in many of the forensic sciences. Forensic toxicology is one discipline where the advances in analytical capability have significantly impacted, and pushed forward, the field. The ability to detect concentrations of analytes not believed possible at one time now are routine. Yet, the one constant that remains is the challenge of interpretive aspects of analytical findings.

One analyte that captures the heart and soul of forensic toxicological challenge is succinylcholine (SC). This powerful paralytic agent is nothing more than the chemical bonding of two abundant natural constituents of the human body – succinate and choline. Indeed after its administration to humans in operating rooms, it is rapidly converted via metabolic processes to its constituent parts. As such, it also makes a wonderful poison in the hands of one skilled in its administration. The challenge to the forensic toxicologist is finding evidence of its administration, especially in embalmed bodies. This latter issue is important in that suspicion of administration of the compound may not occur for days, weeks, months or years after death.

**A Story:** The “Incredible Find” of an analytical technique capable of routinely detecting SC was not an easy process. Indeed, the isolation steps from biological media and the development of an instrumental method to detect concentrations of the necessary analytes not thought possible was perceptibly genius. Not only did the method detect SC, but also its longer lasting intermediate metabolite, succinylmonocholine (SMC). Four years of analyses for the two compounds produced both negative and positive findings, with positive findings almost exclusively for SMC. All seemed fine until the finding of SMC, by another very respected laboratory, in control tissues. Gee, “That’s Strange.” How could this be? Why would this substance be naturally present in our bodies?

“The Wolf,” is a coined Hollywood term for someone who cleans up messes left by hitmen. It's not a fun position, but there is an eerie sense of accomplishment when the job is complete. The Wolf tries to keep a low profile, as one might imagine. Sometimes though, there is just no avoiding the hysteria of a scene. With a quick, “Smile, You're on Camera,” the Wolf is thrust into the limelight trying to explain what did not seem possible. Sometimes there are easy answers and sometimes there are not. But most importantly, the Wolf learns and teaches the hitmen about messes and how to prevent them, even when seemingly unavoidable. Ah! The life of the Wolf.

The story of SC and SMC is not unheard of in the world of forensic toxicology; certainly, other examples exist. When pushing the limits of scientific capability and toxicological interpretation, when going where others won't attempt to go, unexplainable things sometimes happen. But without innovation, without stressing what would otherwise be called impossible, whether it is in forensic toxicology or any other scientific discipline, progress cannot be appreciated. The story of SC and SMC is far from over, indeed, it is just beginning.

#### **Analytical Technique, Succinylmonocholine, Incredible Find**