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PRESENTATION INFORMATION

Title of Presentation:

An Investigation into the Wild Life and Death of Christopher McCandless

Abstract:

Christopher McCandless donated all his money to charity and journeyed alone into the Alaskan wilderness in the early 1990s. When the once-passable Teklanika River rose to unsafe levels, he became stranded and perished after 114 days of hunting and foraging off the land.

The cause of McCandless's death has been a subject of scientific debate. Journal entries document consumption of *Hedysarum alpinum* (wild potato) seeds as a major dietary constituent, followed by severe weakness in the ensuing days to weeks. McCandless, attributing his demise to this plant, wrote "Extremely weak. Fault of pot[at]o seed. Much trouble just to stand up. Starving. Much Jeopardy" after realizing his fatal mistake.

Early reports suggested *H. alpinum* seeds contained swainsonine, an alkaloid responsible for inhibition of glycoprotein metabolism. Others hypothesized whether McCandless misidentified seeds of *Hedysarum mackenzii*, a wild sweet pea thought to contain toxic alkaloidal constituents, as *H. alpinum*. Both theories were disproven. Years later, the amino acid beta-N-oxalyl-L-alpha-beta-diaminopropionic acid (ODAP), the neurotoxin responsible for lathyrism, was mistakenly identified in *H. alpinum* seed using high pressure liquid chromatography (HPLC) and was named as the culprit agent. In 2015, the ODAP theory was disproven using LC-tandem mass spectrometry and L-canavanine, an L-arginine analogue known to be toxic, was named most likely contributor to McCandless's death.

The life and death of Christopher McCandless still intrigues adventurers and scientists decades since his passing. The field of toxicology has much to learn from his story.

Objective 1:

Discuss the pathophysiology and clinical manifestations of lathyrism.

Objective 2:

Distinguish toxicologic manifestations of L-canavanine in animals and humans.

Objective 3:

Appreciate limitations of certain analytical techniques (e.g. high pressure liquid chromatography).