2016 Annual Scientific Meeting
FIT Open Mic Competition

Presenter: Kristin McCloskey, MD

PRESENTATION INFORMATION

Title of Presentation: Mustard Gas: From Chemical Weapon to Chemotherapy

Abstract: Sulphur mustard, or mustard gas, first appeared as a large yellow-brown cloud over the battlefield in Ypres, Belgium on July 1917. Within 24 hours, the unsuspecting victims experienced intense itching and skin irritation, eventually morphing into large blisters, chest pain, sore throat, and ocular pain. Uniforms didn't seem to offer any protection. Those that survived were at risk for severe scarring, blindness, chronic respiratory disease, cancer, and infection from bone marrow suppression. It is estimated that mustard gas was responsible for 1 million casualties in World War I.Though banned by the Geneva protocol in 1925, the US Department of Defense was nevertheless concerned about a re-use of chemical weapons in the impending Second World War. They commissioned two Yale pharmacologists, Louis Goodman and Alfred Gilman, to investigate potential treatments for chemical warfare agents. A physician named Stewart Alexander had already observed that victims of mustard gas exposure exhibited profound bone marrow suppression, and further deduced that it could potentially be used to suppress the division of cancer cells. By exchanging a nitrogen molecule for a sulfur molecule to form nitrogen mustard, Goodman and Gilman developed a more stable compound they subsequently used to treat lymphoma. Their research was effectively the beginnings of the modern era of chemotherapy.

Objective 1:
To provide a brief overview of the use of mustard gas as a chemical weapon in World War I.

Objective 2:
To describe how the devastating experience of chemical warfare led to the discovery of nitrogen mustard.

Objective 3:
To contextualize the role of nitrogen mustard in the development of the field of chemotherapy.