EVE 491/591
Toxicology

Case Study #1. "Mary Beth"

Part 2. Black Lung.

Mary Beth's hometown had been settled by Welsh coal miners that first staffed the deep bituminous coal mines that were the main source of employment in western Pennsylvania for many decades. The name of the town was Welsh for "streams of coal." These mines were also the source of the orange iron sulfate sediment that gave the stream its name. When the coal ore was brought to the surface it was crushed and the coal was separated from crushed rock waste. The rock waste or "spoil" was discarded in piles and, when exposed to water and oxygen, produced sulfuric acid. This, along with the sediment, had washed into the streams surrounding the mine.

The coal mines had already claimed the life of Mary Beth's dad. He had worked in the mines for 50 years. After many years of exposure to coal dust, he had suffered from coal miner's pneumoconiosis, also known as black lung. This disease is caused by breathing coal dust into the lungs. Her dad had caught a case of the flu, which turned into pneumonia, and he died of complications caused by his greatly diminished lung capacity.

Questions

1. Coal dust is an established toxicant. What is the dose, route of exposure and mechanism of action that causes black lung disease?
2. Is coal dust a chemical or physical toxicant? Explain.
3. Is coal dust a targeted or systemic toxicant? Explain.