

**2018 ACMT Annual Scientific Meeting  
FIT Open Mic**

**Presenter:** Sarah Shafer, MD

**Title:** Alchemy Realized

**Abstract:** Alchemy exists in the public imagination as a primordial science where magic and mysticism offer the key to transmutation of base metals to gold. In 1828, Friedrich Wohler accidentally synthesized the first chemical by producing urea from heated ammonium cyanate. Chloral hydrate became the first synthesized pharmaceutical drug in 1832. The discovery of Mauveine, the first synthetic dye, led to a burst of chemical synthesis, some of which were found to have pharmaceutical properties. Coal-tar, a source of aromatic compounds, led to naphthalene, used for deworming. A mistake in naphthalene administration led to the discovery of the anti-fever properties of acetanilide. However, the adverse effects of acetanilide led to the use of phenacetin, which also had severe adverse effects. A metabolite of phenacetin was found to be the etiology of its anti-pyretic and analgesic effects, so in 1950, n-acetyl-p-aminophenol was marketed as Tylenol by McNeil Laboratories. McNeil Laboratories is a subsidiary of Johnson&Johnson, who had a total revenue of 71.3 billion dollars in 2013. However, Pfizer is the world's largest pharmaceutical company, with a 22 billion dollar profit and a profit margin of 43% in 2013. Global gold production in 2016 produced 3010 metric tons of gold. At \$41,138,264/metric ton, this equals 123 billion dollars of gold. The worldwide pharmaceutical market generated over a trillion dollars in revenue in 2015. As a testament to human ingenuity, we have far surpassed the value of gold using nothing more than a pile of coal tar.

**Objective 1:** Discuss early history of chemical and drug synthesis

**Objective 2:** Discuss events leading to production and sale of Tylenol

**Objective 3:** Discuss pharmaceutical company profit and worldwide revenue