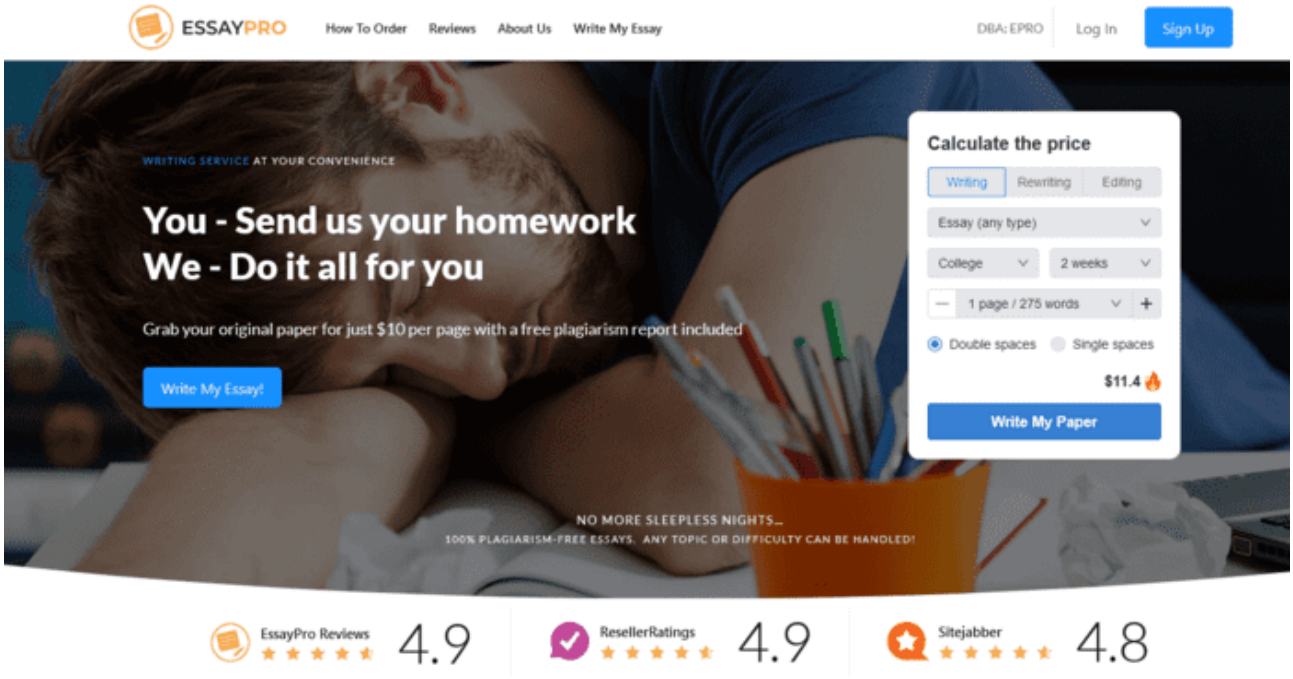
History and Uses of Aspirin



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Topic Definition

Aspirin was invented in late 1890s. More than a hundred years later, due to its fever-reducing and anti-inflammatory effects, it has become one of the world's most extensively used medicines. Interestingly, this famous medicine, at the beginning, was invented by a German scientist in order to find out an effective remedy to cure his father's pain.

History

Innovated by the fact that ancient people use willow bark to ease pain, the first chemically pure and stable acetylsalicylic acid was synthesized by a German chemist called Felix Hoffmann, in 1897 (Bayer AG, 2011). Aspirin was firstly taken by his father in order to reduce his arthritis pain. Aspirin successfully eased the pain. After two years' laboratory experiment, aspirin as a product was first launched by Bayer AG in 1899 (Bayer AG, 2011). The coming world war accidentally boosted the demand of aspirin.

Science Organization

The invention of aspirin, a medical-breakthrough, mainly belongs to the knowledge of chemistry. In order to study how aspirin actually work and its possible side-effect, pharmacology knowledge is also needed.

Knowledge

In terms of production, aspirin can be produced either manually or industrially. Aspirin also known as acetylsalicylic acid to chemists can be obtained from willow bark. In terms of making aspirin industrially, phenol, sodium hydroxide, carbon dioxide, and acid are needed. Firstly, phenol is mixed with concentrated sodium hydroxide to get sodium phenoxide. Then, reacted with carbon dioxide, sodium salicylate is generated. After that, in acidic solvent, sodium ions are substituted by H+ ions. In this way, salicylic acid is produced. To make hard aspirin tablets, corn starch and water need to be added to salicylic acid. Finally, the chemical mixture is compressed into tablets by tablet machines.

In the 100 years after aspirin's birth, although people appreciate its function of pain-curing, no one knew how aspirin actually works until the late 1990s. In the 1970s scientists learned that it is the release of prostaglandins, the molecules which are similar to hormone, after injuries that cause fever and inflammation. The analysis of PGHS (prostaglandin H2 synthase), the enzyme that produces prostaglandin finally reveals the working process of aspirin. The enzyme is surrounded by 2 protein subunit, arachidonic acid, a basic component of prostaglandin, travels through the channel in between the two protein subunits to the core of the PGHS enzyme. Aspirin molecule splits into two, saliucylic acid and acetytl group, after entering the channel of the PGHS enzyme. With the acetyl group blocking the entrance of the channel, arachidonic acid cannot get access to the core of the PGHS enzyme, hence stop the production of prostaglandin.