



Organic Chemistry to Treat Diseases

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Introduction

Organic chemistry is the branch of physics which deals with the properties, structures, reactions, compositions and preparation of carbon containing compounds which not only includes hydrocarbons but also compounds with any number of other elements, for instance oxygen, nitrogen, phosphorus, halogens, sulfur and silicon. Organic chemistry can be used to create new structures and develop better ways of synthesizing known as compounds. Organic chemistry is generally employed by pharmaceutical, chemical, biotech, consumer products, and chemical and petroleum productions. Although, biotechnology is a field of applied biology that actually involves using living organisms and bioprocess to create or modify products for specific use. Virtually all biotechnology results are the product of organic chemistry [1].

Below are few from plenty of applications on how organic chemistry can be useful to treat various diseases. **Figure 1** Illustrates strained and reactive compounds in organic chemistry [2].

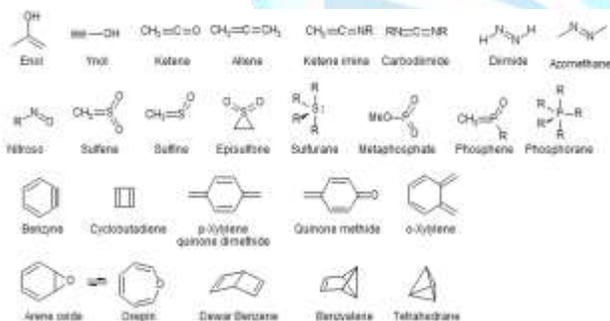


Figure 1: Illustrates Strained and reactive compounds in organic chemistry.

Chemical Compound in the Coffee May Help to Prevent Disease Related to Obesity

A chemical compound that is commonly found in coffee may help in limiting some of the damaging effects of obesity. Researchers found that CGA (Chlorogenic Acid) reduced insulin resistance and addition of fat in the livers of mice who were given a high fat diet. Apart from weight gain, two major effects of obesity are increased insulin resistance and growth of fat in the liver, if it is untreated-it can lead to diabetes and poor liver function. Scientist found that CGA was not only effective in averting weight gain but also helps to maintain normal

sugar levels and healthy liver composition. Nevertheless, scientists believe that CGA may help to form the foundation of treatment of Those who may require additional help [3,4]. **Figure 2** Illustrates chemical structure of chlorogenic acid [5].

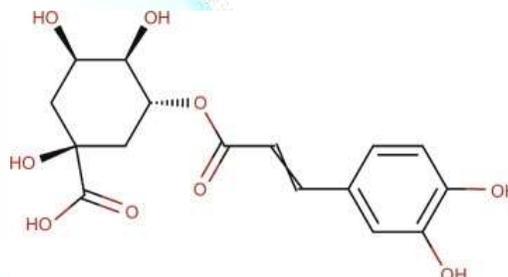


Figure 2: Illustrates chemical structure of chlorogenic acid.

Combating Cancer without Effecting Healthy Cells

To battle against cancer requires eliminating cancer cells but with existing treatments have contradictory consequences on healthy cells. Patients normally develop resistance to the drugs and are affected with side effects as a result of doses used in the treatments.

To solve these problem researchers from Switzerland analyzed 200 combinations of different anti-tumor drugs in an effort reduce the doses. They used a novel method to test the impact of a blend on a cancer cell and healthy cell simultaneously. Scientists discovered a favorable mix of four components called C₂, which can eliminate tumor cells simultaneously leaving healthy cells unaffected. C₂ contains of four products (tubacin, CI-994, erlotinib and dasatinib). This characteristic feature of C₂ is that it targets the supernumerary centrosomes that can only be found in tumor cells. [6,7]

Organic Chemical against Ebola Virus

Scientists found that benzoquinoline inhibited the capability of Ebola virus to multiply and replicate in cell culture. Ebola virus, part of filovirus family, is a single stranded RNA virus that causes serious disease in humans. Only experimental cures were available. There are no approved drugs or Nano medicines to treat Ebola virus or any other filovirus infections, so there is a critical need for new methods.

A possible antiviral target is the viral equipment and activities involved in carrying out RNA synthesis for Ebola virus. An organic chemical



compound demonstrates effective antiviral activity against not only Ebola virus but also several other virus as per the scientist who was led Georgia State University. [8,9]. **Figure 3** Illustrates Prodrug GS-5734 for Ebola virus [10].

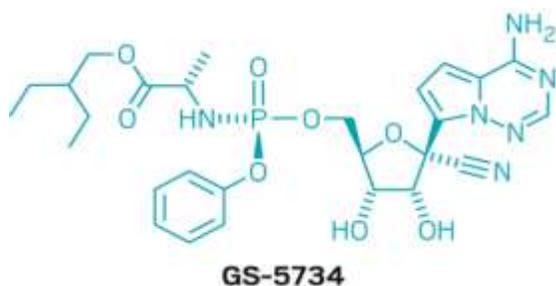


Figure 3: Illustrates Prodrug GS-5734 for Ebola virus.

Gold Compounds to Treat Diseases

Scientists commenced a large scale search for new drugs that would overwhelm the function of a very important element of the immune system, MHC class II proteins, which are associated with autoimmune diseases. MHC class II proteins generally hold pieces of overrunning bacteria and virus on the surface of specific antigen presentation cells. Presentation of these fragments alerts other dedicated recognition cells of the immune system called lymphocytes which are normal immune response. Generally, this response is inadequate to harmful bacteria and viruses, but occasionally this process goes off-center and the immune system turns against itself causing autoimmune diseases such as Lupus, Juvenile diabetes and rheumatoid arthritis.

Gold compounds have been used for the cure of rheumatoid arthritis and other autoimmune diseases for more than 7 decades until now how the metals work has been unknown. Metals work by dismantling bacteria and virus particles from the clasp of a key immune system protein [11]. **Figure 4** Illustrates Chemical structure of Gold compounds [12].

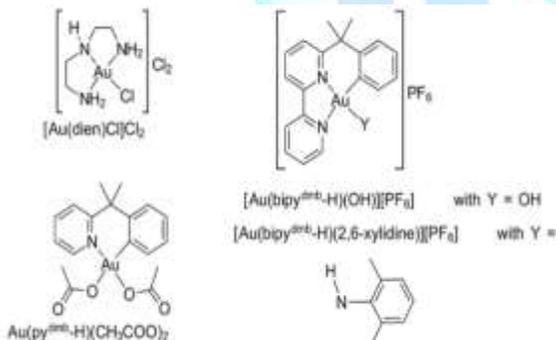


Figure 4: Illustrates chemical structure of gold compounds.

Synthetic Cells to Treat Cancer and Other Diseases

The capability to create artificial cells can be a key step towards more effective drugs to cure cancer and autoimmune diseases and possibly lead to better comprehend of human immune cells behavior. Such cells also could eventually be used to improve the immune system of people with immune insufficiencies or cancer.

Scientists have created a new technique of synthetic T lymphocytes or T cells that are almost similar of human T cells. This artificial cell could be a vital step towards more effective drugs to treat autoimmune diseases and cancer and also it could lead better comprehension of human immune cells performance. Scientists were able to mimic T cells size, shape and flexibility which allow performing simple functions of targeting and homing infections [13,14]. **Figure 5** Illustrates Small molecule anilides revisited as anticancer agents [15].



Figure 5: Illustrates Small molecule anilides revisited as anticancer agents.

Conclusion

This article characterizes about few instances for treatment of diseases using organic chemistry from large, various methods and techniques. It delineates that how organic chemistry can be improved based on the innovation, ethics and technology.

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