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Opinion Article

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Major role of hydrazone and its various derivatives

Giulio Enzo*

Department of Pharmaceutical Sciences, University of Bologna, Bologna, Italy.

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Description

Hydrazone and its derivatives with the azomethine -NHN=CH- group form a significant class of chemicals with a wide range of pharmacological actions. Different hydrazone derivatives having potential pharmacological effects such as anti-inflammatory, antibacterial, analgesic, antifungal, anti-hypertensive, antiplatelet, anticancer, antimalarial, antidepressant, anticonvulsant and antiviral properties has been produced. They interact with additional functional groups to produce pharmacologically active compounds in addition to their expanded biological features. Examining the biological and pharmacological significance of hydarzone derivatives for the upcoming creation of novel therapeutic entities is the main focus of this work.

Anti-inflammatory and analgesic activity

A local response to cellular injury known as inflammation is usually used to refer to a broad phrase for these symptoms: pain, capillary dilatation, odema, heat, redness, and loss of function. Many hydrazone compounds have so far been successfully produced and tested for their analgesic and anti-inflammatory properties. It is crucial to note that COX-I and COX-II play a significant part in inflammation. The parent bioactive molecule's structure can be altered a process that has been widespread throughout time and may increase its biological significance. In this case of modified the structure of piroxicam to create a number of novel hydrazone derivatives. The end products displayed more anti-inflammatory and antinociceptive efficacy than the generic form of piroxicam. Numerous amidine and hydrazone compounds were evaluated for their potential analgesic and anti-inflammatory effects. The substances were found to have effective analgesic efficacy when connected to N-acylhydrazones to phenyl sulfonamide. According to reports the chemicals effectively reduce inflammation by inhibiting the COX-2 enzyme.

Antimicrobial activity

Increased risk of problems from antibiotic therapy is caused by the rise in multi-drug resistant bacterial infections during the past few decades. Therefore researchers continue to face difficulties in the discovery of new and potent antibiotics. Numerous hydrazone compounds have been devised created, and their antibacterial properties researched. Gram positive and gram negative bacteria are both susceptible to antibiotic action. A number of new hydrazone compounds were created and claimed to have strong antibacterial properties. It was discovered that the chemicals were effective against gram positive, gram negative and mycobacterium bacteria. The majority of the synthetic compounds were discovered to have the strongest antibacterial properties. Derivatives of hydrazone shown antibacterial action against *S-aureus* and *E-Coli*. The majority of the novel hydrazones have stronger antibacterial properties.

Antifungal activity

High antifungal medication resistance is blamed for the rising mortality rate in systemic fungal infections. A situation like this makes it necessary to develop safe and efficient antifungal medications for therapeutic usage. Aldehydes were coupled with tert-butyl carbazate to create a number of hydrazones. When hydrazones were screened for antifungal action, the majority of the compounds showed promising results. After further investigation it was discovered that certain

Corresponding Author:
Enzo G.,
E-mail: giulioe@gmail.com

compounds have a substantial antifungal potential.

Anticancer activity

The unregulated and rapid aberrant cell division that can infect neighbouring tissue is known as cancer, and it is a serious problem that researchers are working to solve. Many hydarzone compounds with anticancer characteristics have been created. The process of creating several hydrazide-hydrazone derivatives by modifying pregnenolone's ring D. When compared to the standard treatment doxorubicin, these chemicals were found to be extremely effective against breast cancer, lung cancer and CNS cancer. A significant amount of activity against ovarian cancer cell lines and leukaemia cancer cell lines was demonstrated for the compounds. According to reports the discovered cumarine-based hydrazide-hydrazone derivatives and bromocoumarins have effective anticancer action against hepatic and pancreatic cancers. The most effective anticancer compound was discovered to be N-(4, 8-dimethyl-quinolin-2-yl)-N-(5-methylthiophen-2-ylmethylene)-hydrazine. We discovered new hydrazons to be gastric cancer-fighting. A group of azole-containing hydrazone derivatives were just introduced. The breast cancer and liver cancer cell lines were found to be sensitive to the produced hydrazones.

Antidepressant activity

Depression is a mental condition that, in accordance with the WHO (World Health Organization), is characterised by on-going sorrow and a loss of interest in routine tasks. Depression is a major contributing factor to suicide and affects 300 million individuals worldwide. It has been claimed that a number of hydrazone compounds have antidepressant properties. Created a number of maleimide sulphonamides and sulphonyl hydrazones. Promising antidepressant efficacy was discovered after screening of the substances. It's interesting to note that sulphonyl-hydrazone was discovered to be more active than imipramine. The end-result compounds demonstrated effective antidepressant properties. Compared to tranylcypromine all of the substances show promising antidepressant efficacy.

Anti-platelet activity

The process of platelet aggregation is essential for blood clotting and thrombosis. Cardiovascular disorders, which are often regarded as the primary cause of natural death are frequently brought on by thrombosis. Numerous hydrazone compounds have been created and tested for their antiplatelet capabilities. Developed a number of Indole moiety carrying hydrazone derivatives with antiplatelet aggregation properties. The creation of many thienylacylhydrazone compounds and their antiplatelet properties. According to reports (2-thienylidene) 3, 4-methylenedioxybenzoylhydrazine was the most active substance. Three families of arylsulfonate-acylhydrazone derivatives were used to create a number of novel hydrazones by structurally changing existing thrombin inhibitors. The chemical family that hydrazone and its derivatives belong to exhibits a wide range of pharmacological and biological properties. The biological activities of a variety of hydrazone derivatives have been developed, produced and screened. The proper designing, synthesis, SAR and docking studies of novel hydrazone derivatives can result in the development of new medicinal molecules with a variety of therapeutic activities in the present need and search for powerful chemical structures.