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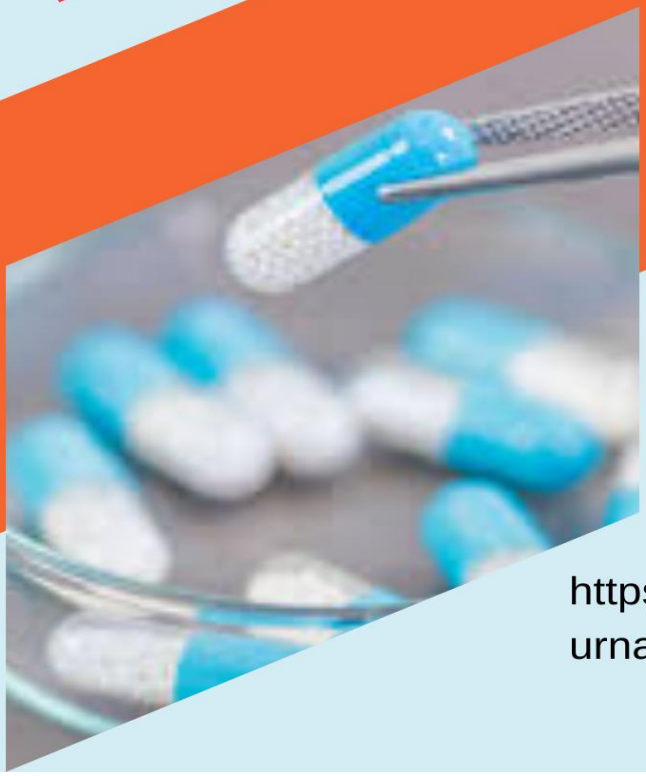

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A comprehensive analysis of drug-metal interactions involving cefixime and metal complexes

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Introduction

When two substances are taken together and have an impact on each other's actions, this is known as a drug interaction. This action may have antagonistic or synergistic effects, or it may have a novel impact that neither would have on its own. Drug interactions are usually the first thing that spring to mind. pharmaceuticals and foods, however, as well as pharmaceuticals and medical plants or herbs, can interact [1]. Tyramine-containing foods should not be consumed by people on antidepressant medications such monoamine oxidase inhibitors because this could cause a hypertensive crisis. These interactions may result from unintentional misuse or from ignorance of the active components of the relevant substances [2]. The significance of these pharmacological interactions in medical practice is thus readily apparent. An overdose could happen if a patient is taking two medications and one of them intensifies the effects of the other. The two medications' interaction may also make side effects more likely [3]. However, if a drug's action is diminished, it may no longer be therapeutically useful due to underdosing. Despite the aforementioned, these interactions may occasionally be sought in order to achieve a better treatment outcome. Examples of this include the combination of clavulanic acid with amoxicillin to overcome bacterial resistance to the antibiotic or the use of codeine with paracetamol to enhance its analgesic impact [4]. Additionally, it should be kept in mind that some interactions may occur theoretically but have no significant effects in practical practice [5]. Pharmaceutical interactions that have adverse effects on an organism are the ones that are particularly relevant to medical practice. A pharmaceutical interaction's likelihood of occurring rises in response to the quantity of medications given to a patient concurrently. Fifteen percent of older persons in the United States may be at risk for a serious drug-drug interaction, and over a third (36%) consistently take five or more prescriptions or supplements. [4] Between 2005 and 2011, there was a notable increase in both pharmaceutical use and the ensuing adverse drug interactions [6]. An interaction between a drug and another substance in the body is perhaps inevitable. Or a medicine may even react with itself in some particular circumstances, as when you're dehydrated. In other cases, the medicine is not impacted in any way by the interaction. In some instances, a drug's presence in a person's blood may have an impact on specific laboratory analyses [7]. Additionally, interactions may take place outside of an organism before the medications are administered. When two medications are combined, for instance in a saline solution before an intravenous infusion, this can happen. Thiopentone and suxamethonium should not be administered in the same syringe, and the same is true for heparin and benzylpenicillin. These are some well-known instances of this kind of interaction. Because of their conceptual similarities, these scenarios will all be covered under one section [8]. Cefixime is a third-generation cephalosporin with a wide range of antibacterial activity, numerous indications, and distinct interactions. Because of this mechanism or action, it produces undesirable side effects of its own or toward other medications, which can lead to the formation of undesirable resistance.

Techniques

There are two main parts to the approach of the review study on this subject. These components are listed below:
Examination of data and information regarding Cefixime and its interactions with other medications: Since Cefixime is an oral antibiotic that is a member of the third generation of Cephalosporins, there are numerous articles and journals that discuss Cefixime. In order to find the interacting effects of cefixime and its linked journal, I had to take these methods in

order to have a better and more consistent result.
An A. searching several databases, including PubMed and Google Scholar, for publications about cefixime.
The B. a selection of articles about cefixime.
The C. List of articles about cefixime and its interactions.
D. removal of less significant articles pertaining to Cefixime's interaction.
E. Extended Analysis of Data and Articles Associated with Cefixime's Interaction.
F. publication of Cefixime's journal with a marginally significant interaction.
G. The final selection of journals pertaining to Cefixime's interactions and a condensed analysis of Cefixime's interactions with metals and other medications.

Searching for Cefixime-related publications in several databases, such as PubMed and Google Scholar: Approximately 160 articles about Cefixime and its various effects were found in various journals, PubMed, Google Scholar, and Science Direct.

Selection of Cefixime-relevant Articles: Next, 140 articles relevant to Cefixime were chosen, and 20 duplicates were eliminated.

Cefixime and its interaction-related article screening: Following the selection of Cefixime-related articles from various databases, 25 additional articles were extracted from the 160 previously chosen articles in order to further understanding and analysis of Cefixime and its interactive effect.

Subtraction of less significant articles related to Cefixime's interaction: Twelve additional articles that had less to do with Cefixime's interactive effect were eliminated after 135 articles were selected. Selection was carried out in a conventional manner in this manner.

Extended Analysis of Data and Articles Associated with Cefixime's Interaction: There were several publications about Cefixime because of its wide range of applications. To have a better understanding, a comprehensive analysis of 123 Cefixime papers was conducted.

26 additional articles that were less significant for cefixime and its interactive impact were eliminated from the journal that dealt with the drug's marginally significant interactions.

The final list of publications pertaining to cefixime's interactions and a condensed analysis of the drug's interactions with other medications and metals: Cefixime is used to treat a variety of Gram-positive and Gram-negative bacteria since it is a broad spectrum oral antibiotic. Because it is used to treat a variety of bacterial infections, its interaction with other medications and metals can be seen. About 95 journals that dealt with cefixime have been examined in an effort to learn more about its brief interaction effect.

Following these procedures, a few crucial instances of Cefixime's interactions with metals and other medications have been selected.

The length of time spent exploring the data: Between July 4, 2020, and August 31, 2020, data and information regarding the interaction of cefixime with various medications and metals were collected. The final result about the cefixime interaction will be discussed here.

Results and Discussion

Dose of Cefixime	Comparator Drug/Metal	Therapeutic Class of Comparator Drug	Interaction Identification
400 mg	Diclofenac sodium, Flurbiprofen, Mefenamic acid and Tiaprofenic acid	NSAIDs	UV visible spectrophotometer [9]
0.086 gm of standard	Copper, Zinc & Cadmium Complexes	Metal	Disk diffusion Method [10]
400 mg/kg	Metformin	Anti hyperglycemic agent of the biguanide class	Rehberry Method [10]
400 mg	Omeprazole,Rosuvastatin,Clopidogrel	Omeprazole-proton pump inhibitor, Rosuvastatin-antihyperlipidemicdrug,Clopidogrel-anti-platelet drug.	RP-HPLCMethod [11]

200 mg	Carbamazepine - Levetiracetam	Carbamazepine Anticonvulsant Levetiracetam- Anticonvulsant.	EEG [12]
400 mg	Nebviolol	Anti-hypertensive	LC-MS Method [12]
400 mg	Bestatin	Protease inhibitor	LC–MS/MS analysis [13]
200mg	Vitamin K1	Vitamin	GLC Method [13]

Table 1: Interactive effect of Cefixime with different therapeutic drugs and metals.

Drug resistance and its unwanted interactive effects can be avoided if few measures can be taken properly [14]. They are- These are the findings of Cefixime's interaction with other medications and metals that were gathered from the journal that was screened.

Monitor the frequency of resistance. Drug susceptibility surveillance systems at the local, national, and international levels would assist in communicating the current level of resistance in a region, enabling more sensible decisions of therapy. Public health professionals would be informed of emerging pathogens by such surveillance, which would also encourage the adoption of control measures by keeping hospitalized patients with possibly hazardous resistant microorganisms apart.

By implementing fresh therapeutic strategies: We need to use our present medications more carefully because there aren't enough new antimicrobials. Improving and reducing usage can lessen resistance and

allow a medication to later reappear as a successful treatment58. In addition to helping to reverse high resistance frequencies, the proper use of antibiotics can prevent the emergence of resistance to newer drugs.

By selecting the right medication class for the right medical condition: Selecting and administering the right medication class and regimen is crucial in reducing the likelihood of drug resistance. Therefore, when prescribing and delivering medications, both the patient and the healthcare provider should exercise particular caution.

In conclusion :

A drug's pharmacological and therapeutical alternation with another drug, or vice versa, is the primary cause of drug interactions. Similar to third-generation cephalosporins, cefixime is a broad-spectrum antibiotic used to treat bacterial infections caused by both Gram positive and Gram negative bacteria. Therefore, there is a significant chance that Cefixime and other medications used for multiple treatment will interact. Because of this, toxicity and multiple drug resistance arise, resulting in undesirable side effects that can worsen a patient's health. As a result, the primary goal of providing medical care is being compromised, which is unacceptable. Several conclusions I drew from this review study are quite important and can benefit both the general public and medical professionals when it comes to prescription and delivering certain medications together. When cefixime and metformin are given to rats together, there is an interaction with hyperglycemia. Cefixime reduces the antimicrobial activity of copper, zinc, and cadmium via interactions. Cefixime alters its own activity and interacts with omeprazole, rovustatin, and clopidogrel. Non-convulsive epilepticus can be brought on by cefixime. Cefixime can change the actual anticipated activity of NSAIDs and raise their plasma blood levels. Cefixime may alter the plasma levels of antihypertensive medications and cause unintended effects. Therefore, in order to ensure a stronger health care system, these drug combinations shouldn't be administered concurrently.

Citations

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