



Effect of dietary components on anticoagulant therapy

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1. Abstract:

Dietary components can significantly influence the efficacy and safety of anticoagulant therapy, necessitating careful management to optimize patient outcomes. This review examines key dietary interactions with anticoagulant medications, including warfarin, direct oral anticoagulants (DOACs), and other agents. Vitamin K, a critical cofactor in clotting factor synthesis, directly impacts warfarin therapy; inconsistent intake can lead to unstable INR levels and adverse events. Conversely, high vitamin K intake can diminish warfarin's effectiveness, while vitamin K antagonists can reverse over-anticoagulation. Other dietary components, such as vitamin E, garlic, ginger, fish oil, and alcohol, may affect bleeding risk and drug metabolism, influencing anticoagulant therapy. Herbal supplements also present potential interactions that can complicate anticoagulant management. Clinicians must provide patient education on maintaining a stable diet, monitor coagulation parameters regularly, and adjust therapy as needed to mitigate risks. This review underscores the importance of integrating dietary considerations into the management of anticoagulant therapy to enhance safety and therapeutic efficacy.

Key words :food interaction , supplements , pharmacokinetics , Bleeding , warfarin , Anticoagulation , Dietary supplements .

2. Introduction:

Food-drug interactions can significantly impact patient care by altering the effectiveness of medications or increasing toxicity, leading to therapeutic failure or extended hospital stays. This review highlights clinically relevant interactions organized by drug classes according to the Anatomical Therapeutic Chemical (ATC) classification. An accompanying table lists drugs alphabetically with dietary recommendations, mechanisms, consequences, and assessments of clinical relevance, along with the Scottish Intercollegiate Guidelines Network

(SIGN) grading for scientific evidence. Notably, peristaltic agents requiring specific meal timing and alcohol interactions are excluded from this review. There is an urgent need for strategies to identify and mitigate these interactions to improve patient outcomes.

Anticoagulation therapy, particularly with warfarin, is essential for preventing thromboembolic complications in various conditions such as atrial fibrillation and venous thromboembolism. Warfarin, a widely used oral anticoagulant for over six decades, operates by inhibiting vitamin K-dependent clotting factors, which are crucial for normal coagulation. Its effectiveness is significantly influenced by dietary components, particularly vitamin K, which can reverse its anticoagulant effect.

Warfarin is metabolized in the liver primarily by the cytochrome P450 enzyme system, specifically CYP 2C9, which impacts dosing variability among patients based on factors like age, genetics, and dietary intake. The therapeutic window for warfarin is narrow, necessitating regular monitoring of the International Normalized Ratio (INR) to ensure effective anticoagulation without increasing bleeding risk.

Interactions with food, medications, and herbal supplements are common. For example, certain foods high in vitamin K can diminish warfarin's effects, while others, like cranberry juice, can enhance its potency, increasing bleeding risk. Herbal supplements, often used without disclosure to healthcare providers, can also interact with warfarin, complicating patient management.

The prevalence of complementary and alternative medications (CAMs) among patients on warfarin is notable, with many patients unaware of potential interactions. Educating both healthcare providers and patients about these risks is crucial to optimize anticoagulation therapy and minimize adverse outcomes. Understanding the interactions between warfarin and dietary components is essential for effective long-term management and patient safety.

"Your guide to understanding warfarin: the most widely used oral anticoagulant" Warfarin, also known by the brand name Coumadin, has been a staple in the treatment and prevention of blood clots for over six decades. It is the preferred oral anticoagulant for long-term management in various conditions such as atrial fibrillation, prosthetic heart valves, venous thromboembolism, and coronary artery disease. In this article, we will delve into the mechanism of action, metabolism, and potential interactions of warfarin with foods, herbs, and other dietary supplements.

Mechanism of action

Warfarin works by interfering with the cyclic interconversion of vitamin K and its 2,3 epoxide, which is an essential cofactor for the production of clotting factors in the liver. This interference results in the production of partially carboxylated and decarboxylated proteins, which have reduced anticoagulant activity. This effect can be reversed by the intake of vitamin K1. The drug is a racemic mixture of two enantiomers, with the S-enantiomer being more active than the R-enantiomer.

Metabolism

Warfarin is primarily metabolized in the liver by the cytochrome P450 (CYP) system. The isozymes involved in its metabolism include 2C9, 2C19, 2C8, 2C18, 1A2, and 3A4. Of these, the 2C8/9 isozyme is responsible for metabolizing the S-enantiomer, while the 3A4 isozyme is responsible for metabolizing the R-enantiomer. This results in the formation of inactive hydroxylated metabolites and reduced metabolites with little anticoagulant activity.

Interactions with foods, herbs, and dietary supplements

One of the challenges with using warfarin is its potential interactions with various foods, herbs, and dietary supplements. Vitamin K-rich foods such as leafy greens, broccoli, and avocado can counteract its anticoagulant effect. Patients prescribed warfarin are advised to maintain a consistent intake of these foods and to limit their intake of vitamin K to avoid drastic fluctuations in their INR (international normalized ratio) levels.

Certain herbal supplements, such as ginkgo biloba, garlic, and ginger, have been reported to interact with warfarin and increase the risk of bleeding. It is essential to inform your healthcare provider about any herbal supplements you are taking to prevent potential interactions.

Other dietary supplements, such as fish oil and omega-3 fatty acid supplements, also have the potential to interact with warfarin and increase the risk of bleeding. It is crucial to consult with your doctor before starting any new dietary supplements while on warfarin.

Conclusion

Warfarin has been a tried and tested oral anticoagulant for over 60 years, and it continues to be the go-to medication for long-term management of various conditions. However, it is essential to understand its mechanism of action, metabolism, and potential interactions with foods, herbs, and dietary supplements to ensure its safe and effective use. As always, it is crucial to communicate with your healthcare provider and inform them of any dietary changes or supplements you are taking to prevent any potential interactions and ensure optimal treatment outcomes.

3 . What are Anticoagulants :

Blood thinners, often known as anticoagulants, are a class of drugs that prevent blood coagulation. They are recommended to prevent the formation of dangerous blood clots. Anticoagulants are frequently used to treat conditions where the production of blood clots is more likely. These include, among many other conditions, polycythemia vera, myocardial infarction, deep vein thrombosis, and factor V Leiden.

3.1 characteristics of the Drug

physical and chemical characteristics of a drug are important factors in its potential for interactions with food. Different drugs within the same drug group or different formulations of identical drugs can have different chemical characteristics and thereby completely different food-drug interactions. However, it is generally not possible to exactly predict food-drug interactions only from knowledge of the physicochemical properties of the drug, and interaction studies of drug pharmacokinetics and effects with or without concomitant food intake are required.

3.2 Characteristics of Meal

If you suddenly start eating foods that have more vitamin K while you take warfarin, you may make warfarin less effective. If you suddenly start eating foods that have less vitamin K while you take warfarin, you may increase your chances of side effects from warfarin.

❖ Foods rich in vitamin K

Foods that are rich in vitamin K include leafy vegetables. These may make warfarin less effective.

Examples include: kale ,spinach , Brussels sprouts ,parsley , collard greens ,mustard greens , endive, red cabbage , green lettuce ,chard.

You should also avoid drinking:green tea , grapefruit juice , cranberry juice , alcohol

Green tea contains vitamin K and could lower the effectiveness of warfarin. Drinking grapefruit juice, cranberry juice, and alcohol during treatment with warfarin can increase your risk of bleeding.

❖ Foods low in vitamin K

There are a variety of foods that are low in vitamin K that can help you create and enjoy a well-balanced diet.

Some vegetables and fruits low in vitamin K include: sweet corn , onion , squash ,eggplant , tommatos , mashrooms ,sweet potatoes , cucumbers (raw) , artichoke , strawberries , apples , peaches ,watermelon , pineapple, bananas .

3.3Pharmacokinetic and pharmacodynamics parameter

The bioavailability and the effect of most drugs are correlated, making changes in bioavailability an important effect parameter of food-drug interactions. Bioavailability is dependent on absorption and first-pass metabolism. The most important pharmacokinetic food-drug interactions are caused by changes in the absorption of a drug because of chemical reactions between the drug and the food

❖ Pharmacokinetics

A pharmacokinetic model for the absorption, distribution, and elimination of warfarin. Warfarin is essentially completely absorbed, reaching a maximum plasma concentration between 2 and 6 hours. It distributes into a small volume of distribution (10 L/70kg) and is

eliminated by hepatic metabolism with a very small clearance (0.2 L/h/70kg). The elimination half-life is about 35 hours.

❖ Pharmacodynamic

A pharmacodynamic model for the effect of warfarin on the synthesis of clotting factors (prothrombin complex). Prothrombin complex synthesis is inhibited 50% at a warfarin concentration of about 1.5 mg/L. Warfarin concentrations associated with therapeutic anticoagulation are of similar magnitude.

4. Interaction of Warfarin and other dietary supplements ,herbs , vitamins.

Warfarin, a popular anticoagulant medication, is often prescribed to patients who are at risk of blood clots or stroke. However, for those taking warfarin, the use of herbal and dietary supplements can cause concern. Limited information about the pharmacokinetics and pharmacodynamics of these supplements may lead to speculation about their interactions with warfarin, making it important for both healthcare professionals and patients to be well-informed about the potential risks.

The current body of research on warfarin interactions with herbal and dietary supplements is largely based on case reports and small cohort studies, which may not provide enough evidence to fully understand the nature of these interactions. This lack of concrete data has resulted in hypothetical speculation as the main source of information for many of these interactions.

One of the main concerns with warfarin interactions is its potential impact on the body's ability to absorb the medication. Theoretically, the anticoagulant effect of warfarin can be reduced by a decrease in its absorption. This is where the role of supplements and herbs comes into play. Certain supplements and herbal medications have been identified as possible inhibitors of warfarin absorption, leading to potentially dangerous consequences for patients relying on the medication to prevent blood clots.

While the most well-known mechanism of interaction between herbal supplements and warfarin is through vitamin K, there are many other possible mechanisms at play. For instance, some supplements may increase the production of liver enzymes that can break down warfarin, resulting in a decrease in the medication's effectiveness. Other supplements may interfere with the body's metabolism of warfarin, causing a potential increase in the drug's concentration and resulting in an elevated risk of bleeding.

The interactions between warfarin and supplements are not limited to just absorption and metabolism. Other factors such as changes in platelet function, protein binding, and the activity of transport proteins can also impact how warfarin works in the body. This highlights the complexity of the relationship between herbal supplements and warfarin and reinforces the need for further research to better understand these interactions.

In addition to the potential negative impacts on the effectiveness of warfarin, some supplements may also have a positive effect on the medication. For example, ginkgo biloba has been shown to have a beneficial effect on platelet aggregation, potentially reducing the risk of bleeding in patients taking warfarin.

One of the biggest challenges in this area of research is the lack of regulation and standardization of dietary supplements. Unlike prescription medications, herbal supplements are not required to undergo rigorous testing or FDA approval before being sold to consumers. This lack of regulation means that the ingredients listed on the label may not always be accurate, making it difficult to determine the exact components and amounts of these supplements.

In conclusion, limited information about the pharmacokinetics, pharmacodynamics, and true ingredients in herbal and dietary supplements can lead to speculation when it comes to their interactions with warfarin. While case reports and small cohort studies make up the bulk of the data on these interactions, there is still much to be uncovered about the mechanisms and potential risks. As healthcare professionals and patients, it is crucial to be aware of these possible interactions and to approach the use of herbal supplements with caution. More research is needed to fully understand the complex relationship between herbal supplements and warfarin interactions, and until then, it is best to err on the side of caution.

4.1 Garlic

Garlic (*Allium sativum*) has been a staple in cuisines all over the world for centuries. But did you know that this pungent herb is not just for flavoring dishes, it also has numerous health benefits? In fact, garlic has been used for medicinal purposes since ancient times. In this article, we will delve into the benefits of 1.8 garlic and how it can improve your overall health. First and foremost, garlic is rich in essential nutrients such as manganese, vitamin B6, and vitamin C, making it a great addition to your diet. But what sets garlic apart from other herbs is its high concentration of allicin, a compound with potent antibacterial, antiviral, and antifungal properties. One of the most well-known uses of garlic is its ability to lower blood pressure. Hypertension, or high blood pressure, is a common health problem that can lead to serious health issues if left untreated. According to studies, consuming garlic can help lower blood pressure, which in turn reduces the risk of heart disease and stroke. This is due to the allicin in garlic that helps relax blood vessels and improve blood flow. Hyperlipidaemia, or high cholesterol, is another health condition that can be managed with the help of garlic. Cholesterol is a fatty substance found in the blood that can clog arteries and increase the risk of heart disease. However, studies have found that consuming garlic can lower total cholesterol levels and increase the levels of good cholesterol (HDL) in the body. But the benefits of garlic don't stop there. Research has also shown that garlic can prevent age-related vascular changes and atherosclerosis. Atherosclerosis is the buildup of plaque in the arteries, which can restrict blood flow and increase the risk of heart attack and stroke. The sulfur compounds in garlic help prevent the hardening of arteries and reduce the risk of atherosclerosis. While garlic has numerous health benefits, it's important to note that it can

interact with certain medications. Garlic contains compounds that can inhibit the activity of certain enzymes in the body, including CYP 2C9, CYP 2C19, and CYP 3A4. These enzymes are responsible for breaking down drugs in the body, and consuming garlic supplements containing allicin can decrease their effectiveness. It's essential to consult with your doctor before adding garlic supplements to your medication regimen. Moreover, garlic's effect on platelet function is well-documented. Platelets are blood cells responsible for forming blood clots, and garlic has been found to hinder their function. This can increase the risk of bleeding, especially for those who are already taking medications that thin the blood. If you have a bleeding disorder or are about to undergo surgery, it's best to avoid consuming garlic to prevent any complications. In conclusion, garlic is a powerhouse herb that comes with numerous health benefits. From reducing blood pressure and cholesterol levels to preventing age-related vascular changes and atherosclerosis, this pungent herb has a lot to offer. However, it's crucial to consult with a healthcare professional before taking garlic supplements, especially if you are on medication. Incorporate garlic into your diet in moderation and reap its many health benefits. In addition to bleeding concerns, garlic has the potential to decrease systemic and pulmonary vascular resistance in laboratory animals, an effect that was observed in clinical studies as well.

4.2 Ginger

Ginger, also known as *Zingiber officinale*, has captured the attention of many due to its rich history and numerous health benefits. This spice has been used for centuries in traditional Chinese, Indian, Arabic, and Greco-Roman medicines for its medicinal properties. From treating arthritis and rheumatism to aiding in digestion and preventing nausea, ginger has a wide range of reported health benefits that have made it a staple in many households.

One of the most remarkable components of ginger is its volatile oil, which makes up to 3% of its composition. This oil is mostly made up of monoterpenoids and sesquiterpenoids, which are known for their anti-inflammatory and antioxidant properties. These compounds are also responsible for giving ginger its characteristic spicy and pungent flavor.

Gingerols, another key compound found in ginger, have been extensively studied for their medicinal properties. These compounds have shown to have anti-inflammatory, anti-bacterial, and anti-tumor effects, making ginger a potential natural remedy for a wide range of health conditions.

One of the well-known uses of ginger is its ability to alleviate nausea and vomiting. In fact, ginger has been proven to be just as effective as prescription anti-emetic drugs in treating motion sickness and preventing nausea after laparoscopy. This is due to the active compounds in ginger that work on the nervous system, reducing the sensation of nausea and vomiting.

However, despite its numerous benefits, it is important to note that ginger may interact with certain medications, such as warfarin, a blood-thinning medication. A case report of a 76-year-old woman on warfarin for atrial fibrillation showed an increase in her INR levels after consuming ginger as a natural remedy for an upset stomach. This highlights the importance of consulting with a healthcare professional before incorporating ginger into your diet,

especially if you are taking medication.

The mechanism behind the interaction between ginger and warfarin is not fully understood and has not been reported elsewhere. It is believed that the active compounds in ginger may interfere with the intestinal or hepatic CYP system, which is responsible for metabolizing warfarin. This can lead to an increase in the drug's effects and potentially dangerous bleeding. In conclusion, ginger is a powerful spice that has been used for centuries for its medicinal properties. From relieving pain and inflammation to aiding in digestion and preventing nausea, ginger has become a go-to natural remedy for many health issues. However, it is important to use it cautiously, especially if taking medication, and always consult with a healthcare professional before incorporating it into your daily routine. With its many benefits, ginger truly is a valuable addition to any diet.

4.3.Ginseng

Ginseng, also known as *Panax ginseng*, is a perennial herb that has been used in traditional eastern Asian medicine for thousands of years. Highly valued for its reported benefits as a stimulant and aphrodisiac, ginseng has recently gained popularity in the United States and other countries as a natural way to increase alertness and energy. In fact, global sales of ginseng exceeded a staggering 1.5 billion US dollars in 2008.

This versatile herb can be found in various forms, including beverages such as energy drinks. For example, Original Rockstar™ contains 25 mg of ginseng while SoBe® Green Tea contains 50 mg. But what makes ginseng so popular? The answer lies in its bioactive components, specifically the ginsenosides found within the herb. These components are metabolized in various parts of the body, including the hypothalamus-pituitary-adrenal axis and immune system, and are responsible for ginseng's acclaimed benefits. One of the key benefits of ginseng is its potential to improve immune function. Studies have shown that the saponin complexes within ginsenosides may inhibit platelet-activating factor, reducing platelet volume and promoting a healthier immune system. However, it's important to note that there have been rare cases of ginseng consumption being associated with vaginal bleeding and increased blood-clotting time. It's crucial to consult with a healthcare professional before incorporating ginseng into your daily routine. Furthermore, there have been reports of ginseng interacting with certain medications, including anticoagulants. This may alter the effectiveness of these medications, making it important to exercise caution when taking ginseng alongside any prescription drugs. In addition, while ginseng appears to be safe when taken alone, its potential interaction with non-steroidal anti-inflammatory drugs (NSAIDs) has not been thoroughly studied. In terms of dosage, studies have shown that ginseng at a concentration of 0.1 mg/mL may inhibit thromboxane formation in vitro. However, a separate study found no significant effect on platelet function at an undisclosed dose. It's essential to consult with a healthcare professional before determining the appropriate dosage for your specific needs. In conclusion, ginseng is a highly valued herb with a rich history in traditional eastern Asian medicine. Its bioactive components, specifically the ginsenosides, have been linked to various health benefits, including improved immune function. However, as with any supplement, it's essential to consult with a healthcare

professional before incorporating ginseng into your daily routine, especially if you are taking any medications. With its potential to increase alertness and energy, ginseng is a natural option to consider for those looking to boost their overall well-being.

4.4 Ginkgo Biloba:

Ginkgo biloba, also known as the maidenhair tree, is a tree that has been around for over 180 million years. It is considered to be the oldest surviving tree species on earth, with its origins tracing back to the time of the dinosaurs. Despite its long history, the use of ginkgo as a medicinal herb is a fairly recent discovery. In recent years, ginkgo has gained popularity for its potential health benefits, particularly for cognitive disorders and cardiovascular health. In this article, we will dive into the world of ginkgo and explore its potential as a natural remedy.

Derived from the leaves of the ginkgo tree, ginkgo extracts are a rich source of compounds such as terpene trilactones, flavonoids, biflavones, proanthocyanidins, alkylphenols, and polyphenols. These compounds are believed to be responsible for the plant's pharmacological effects. Ginkgo has been used in traditional medicine for centuries to treat a variety of ailments, and today, modern medicine is starting to catch up. One of the most well-known uses for ginkgo is for cognitive disorders. Studies have suggested that ginkgo may stabilize or even improve cognitive performance in patients with Alzheimer's disease and multi-infarct dementia. This is due to its ability to alter vasoregulation, act as an antioxidant, modulate neurotransmitter and receptor activity, and inhibit platelet-activating factor (PAF). However, it is important to note that ginkgo has not shown the same effects in healthy geriatric patients. In a research study, ginkgo's ability to cross the blood-brain barrier was evaluated by measuring plasma and brain levels of terpene trilactones after a single oral dose of ginkgo extract. The results showed that ginkgolides A and B and bilobalide were able to cross the blood-brain barrier, demonstrating the potential for ginkgo to have a direct effect on brain function. Aside from its positive effects on cognitive health, ginkgo has also been studied for its potential benefits in treating other conditions. These include peripheral vascular disease, age-related macular degeneration, vertigo, tinnitus, erectile dysfunction, and altitude sickness. However, more research is needed to fully understand the effectiveness of ginkgo in these areas. One potential concern for the use of ginkgo is its effect on platelet function. Ginkgo has been shown to inhibit platelet-activating factor (PAF), which raises concerns for surgical patients. However, studies have shown that ginkgo only has a mild effect on platelets and does not significantly impact coagulation parameters or bleeding time. Despite this, there have been some cases of catastrophic bleeding associated with ginkgo use, including a case of spontaneous hyphema and postoperative bleeding. Therefore, it is important to consult with a healthcare professional before taking ginkgo if you have a scheduled surgery. It is also worth noting that commercial ginkgo extracts are standardized for their content of terpene trilactones and flavonoids, as these are believed to be the most beneficial compounds. This ensures that the potency and effectiveness of the product are consistent across different batches. In conclusion, ginkgo biloba is a powerful leaf that has stood the test of time. Its long history of use in traditional medicine, combined with modern research, has highlighted its

potential as a natural remedy for cognitive and cardiovascular health. While it may not be a cure-all, there is evidence to suggest that ginkgo could have a positive impact on certain health conditions. As with any supplement, it is important to consult with a healthcare professional before adding ginkgo to your regimen, especially if you have a medical condition or are taking any medications.

4.5 Green Tea

The second most popular beverage in the world and one of the oldest potions is tea made from *Camellia sinensis*. There are three varieties of tea: oolong, black, and green. Polyphenolic chemicals are present in green tea, which is a dehydrated tea that is made by steaming and drying fresh tea leaves without any fermentation. Of the dry weight of green tea, catechins make up 16% to 30%. The primary catechin in green tea, epigallocatechin-3-gallate (EGCG), is mostly in charge of the biological action that green tea mediates. Green tea and EGCG both markedly extended the amount of time that conscious mice spent bleeding from their tails in an early *in vitro* and *in vivo* investigation. They exhibited a dose-dependent inhibition of rat platelet aggregation caused by collagen and adenosine diphosphate. The suppression of thromboxane A2 production may be the cause of the antiplatelet action. Arachidonic acid release and thromboxane A2 synthase inhibition may have prevented thromboxane A2 synthesis because catechins in washed platelets block ATP release from a dense granule. Regarding a potential negative impact of green tea on platelets, a case study revealed that thrombotic thrombocytopenic purpura occurred in a patient who had taken a weight-loss product including green tea. Drinking green tea can counteract the anticoagulant effects of warfarin because it contains vitamin K.

4.6 Mango

Mango (*Mangifera indica*) consumption has been linked to higher INRs in 13 participants, with two of those patients seeing comparable outcomes after retaking the challenge. Before the INR was measured, the patients were eating one to six mangos a day for two days to a month. INR levels dropped in each of the 13 patients following Stop eating mangos. Mangos have a high vitamin A content, which has been proposed as the mechanism for this interaction. Studies on humans have revealed that retinol, or vitamin A, inhibits the CYP 2C19 enzymes. It is advisable to advise warfarin patients to restrict their intake of mangos or stick to a weekly intake to minimize INR swings until additional clinical trials are finished.

4.7 Papaya

The fruit of the papaya tree, *Carica papaya*, contains a combination of enzymes called papain. One case report details a patient who used papaya extract containing papain as a weight-loss tool and had an interaction between warfarin and papaya. When the patient's two warfarin prescriptions were stopped, their INR dropped from 7.4 to 2.0, the patient was ready for heart surgery and the extract from papaya. It has been recommended that individuals using warfarin should not consume papaya due to the possibility of bleeding and damage to the gastrointestinal mucous membrane. This is despite the paucity of research supporting a

potential interaction between warfarin and papaya. It might possibly raise the INR, but just one case involving papaya extract—not the fruit—has been documented to have this impact.

5. what you should remember about food medicine interactions Be aware of the following :

Before using vitamin supplements together with medication, speak with your chemist or healthcare professional. Certain medications may interact with vitamins and minerals. Avoid mixing medications with hot beverages as the heat from the beverage may negate the medication's therapeutic effects. Never take medication while drinking alcohol. Alcohol can alter how well medications are absorbed and thus either make them more or less effective.

Make sure your chemist and healthcare provider are aware of all the medications you use, including over-the-counter ones.

Get all of your prescription drugs from one pharmacy, and let the pharmacist know about any over-the-counter medications, vitamins, herbs, or supplements you use. To make it easier to identify them, keep all medications in their original containers.

Things to keep in mind when combining food and medications Recognise the following: Find out from your chemist or medical professional if there are any foods, drinks, vitamins, or supplements you should stay away from while taking your medications. Check the container's prescription label. Consult your chemist or healthcare practitioner if you have any questions or feel that you need further information. Examine all medication labels and instructions for directions, cautions, and interaction guidelines.

Foods, drinks, and supplements can interact with over-the-counter medications as well. Unless your pharmacist or healthcare professional instructs you otherwise, take medication with a full glass of water. Unless instructed otherwise by your pharmacist or healthcare practitioner, avoid mixing medications with food or breaking open capsules. This could alter how the medication functions.

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