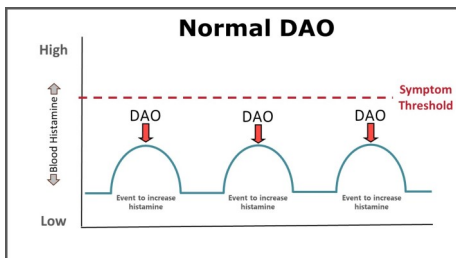
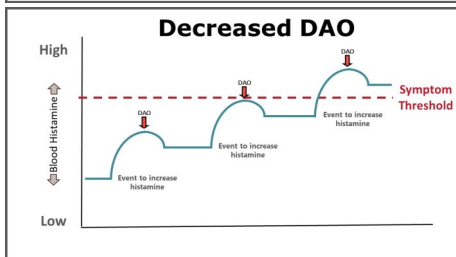


Diamine Oxidase Enzyme (DAO)

Histamine is an important body chemical that circulates through the blood. Diamine oxidase enzyme breaks histamine down and keeps blood histamine in the normal range. Decreased DAO may lead to higher blood histamine levels and possible symptoms. The following video shows how this happens (here are the slides from the video).



We have blood histamine from low to high. This point is the symptom threshold. If the blood histamine rises above this point, the person experiences symptoms. To begin, we'll talk about normal DAO. When different events increase histamine, DAO breaks the histamine down, so it stays within a normal range.



Now we'll look at Decreased DAO. The histamine is not broken down efficiently and it accumulates and the blood histamine levels rise above the symptom threshold.



You can see how important DAO in blood is.

DAO is also found in the digestive system. It breaks food histamine down and prevents excess histamine from being absorbed from the digestive system. If digestive DAO is low, excess dietary histamine may be absorbed. In the next section of this article, we'll examine factors that may reduce DAO activity.

Factors that May Reduce DAO Activity

Several factors may reduce DAO activity. This information is based on theory and speculation because there has been very little research on this topic.

Genetics: some people may be genetically programmed to produce less DAO enzyme.

Intestinal damage: Damage or inflammation to the inner lining of the digestive system may decrease DAO. However, patients with undiagnosed celiac disease (significant inflammation in the digestive system) do not suffer with increased histamine related symptoms compared to the general population— which is what you would expect, if

this theory were true. Nevertheless, this theory makes sense and may occasionally account for low DAO.

Reduced copper, zinc and B6: These nutrients are co-factors for the DAO enzyme, so theoretically lower levels would reduce its effectiveness. Many practitioners recommend mega-dose amounts of these nutrients, but it's unlikely to be helpful. For example, if a reduced zinc intake is compromising DAO function, an adequate intake should improve DAO function. However, a mega-dose amount will not increase DAO function beyond an adequate intake. Consider taking a multi-vitamin/mineral supplement, with around 100% of the nutrient requirements.

Certain medication: There are long lists of “DAO blocking” medications on the internet. Similar to the problematic dietary lists, the medication lists are primarily based on anecdotal reports (i.e., people assume that problematic medications are DAO blockers). There has only been one research study that has investigated this topic. The study demonstrated that some medications inhibit DAO in a test tube. Further studies are needed to see how this applies to real life situations. Also, only a handful of medications were studied. The effect of other medications is not known. The right medication can be more important than potential DAO inhibition. For example, one client attributed his symptoms to an antibiotic that he received in the hospital. However, that was the best antibiotic to cure his infection. Without it, he may have died.

Alcohol: Most clients report significantly worse symptoms with alcohol intake. There is no direct evidence, but alcohol is thought to inhibit DAO.

Foods with elevated diamine content: As we discussed in [Histamine in Food](#), many other diamines form in food alongside histamine. The other diamines are also broken down by DAO – reducing histamine breakdown.

High body histamine level: Chronic histamine excess in the body (e.g., allergies, stress, mast cell disease, etc.) may reduce DAO production. Lowering body histamine may increase DAO production, which possibly explains why some clients find benefit from a low histamine diet, but can gradually return to their usual diet after about four weeks.

No Validated Tests

Tests that measure the activity of DAO in the blood are available in Europe. There have only been a few studies. The results are interesting, but not sufficient to establish it as a validated test. Additionally, it is unknown if blood DAO activity correlates with digestive levels (which is the foundation of the histamine intolerance theory). In North America, some labs offer DAO testing, but it is a different technique than the European tests, and there is no research to support them.

DAO Supplements

Supplementing the natural DAO in the digestive system may increase histamine breakdown and reduce absorption. However, DAO supplements do not increase blood DAO and therefore, would not reduce histamine from other sources (e.g. pollen allergies).

Pea Sprouts

A few research studies indicate that pea sprouts have high levels of DAO. Dr. Janice Joneja (Immunology Ph.D. and Canadian dietitian) popularized this theory. Very few details are known, so the current guidelines are an educated guess. Hopefully, further research will provide more details (e.g. what legumes, how to sprout them, etc.). However, pea sprouts are nutritious, so it is worth trying even if it does not reduce your symptoms.

Commercial Supplements

Sciotec, an Austrian company, has developed a technique to isolate DAO from pig kidneys. Currently, this is the only commercially available DAO supplement. There have been a few clinical trials, but more research is needed. However, supplements (such as DAO) that make an immediate difference to symptoms require lower levels of evidence than supplements that claim to prevent long-term problems (but the individual has no way to judge its effectiveness).

Availability

Sciotec sells the DAO microcrystals under different brand names throughout the world.

The official products in the US and Canada are Umbrellux DAO, HistDAO (Xymogen) and Histamine Block (Seeking Health). Other products that claim to contain DAO enzyme are misleading.

DAOsin is available in Europe.

Financial Disclosure: I have developed education programs with funding from Umbrellux in the past.

Trying the Supplement

DAO enzyme breaks histamine down immediately so you will know quickly if this supplement will improve your symptoms. Umbrellux offers a [sample kit](#) with ten

tablets for ten dollars, plus shipping.

Readers often want to know how they should trial the supplement. There is no “right way.” Take the DAO supplement about 15 minutes before a meal. The capsule needs time to breakdown in the stomach so the enzyme can mix with the food. Finish your meal within 15 minutes (and don’t snack afterwards!) The number of tablets depends on several factors and everyone is different. It takes some experimentation.