3.2.2.3.6.15 Is yohimbine a MAO inhibitor?

Are yohimbe and/or yohimbine MAO inhibitors? There seems to be a fair bit of confusion. The confusion is caused by the fact that while yohimbe and yohimbine are not MAO inhibiting in the same manner as drugs used expressively as MAO inhibitors (see list at the end of this article), there indeed seems to be some influence on MAO activity.

Ellen Coleman, RD, MA, MPH, claims on the Health Care Reality Check web site (quoted August 19, 1999):

“Yohimbine is a monoamine oxidase inhibitor which means that tyramine containing foods (red wine, liver, cheese) and nasal decongestants or diet aids containing phenylpropaanolamine should be rigorously avoided if it is used to prevent a hypertensive crisis.”

While the Health Care Reality Check web site is dedicated to the noble task of protecting consumers from quacks who will sell anything as remedy against any condition as long as it earns them a buck, they exaggerated their reporting on yohimbe and yohimbine:

“According to the FDA, documented health hazards include low blood pressure, weakness, and nervous stimulation, followed by paralysis, fatigue, stomach disorders, kidney failure, seizures and death. The FDA has declared yohimbine unsafe and ineffective for over the counter sale.”

This is simply wrong. Yohimbine may not be an over-the-counter medication. But yohimbine is a FDA-approved prescription drug. If it were inappropriate, the FDA approval would be withdrawn. And as far as “documented health hazards” are concerned, well, death, and a variety of diseases leading to it, are documented health hazards for many antibiotics. And like antibiotics, yohimbine is useful in spite of documented health hazards associated with it.

But the topic of this article is yohimbe / yohimbine and MAO inhibition.

Monoamine oxidase (MAO) inhibition is a profound physiological event, definitely not something to be overlooked in the description of

any medication. Chairman MAO is an enzyme present in various parts of the body, primarily in the digestive system and the central nervous system. Its function is the deamination of foods and neurotransmitters.

The crucial impact of monoamine oxidase (MAO) inhibitors is related to this parallel occurrence of monoamines in food and catecholamine neurotransmitters such as dopamine, epinephrine (adrenaline), and norepinephrine (noradrenaline). If the action of the MAO enzyme is interrupted, the breakdown of these catecholamine neurotransmitters is hindered. This is wished for in the treatment of Parkinson's, a disease characterized by a depletion of dopamine.

MAO inhibitors are "dangerous" medications because they not only inhibit the breaking down of monoamine neurotransmitters but also can interfere with the deamination of monoamines in the digestive tract. If then, monoamines make their way past the digestive tract they can start acting in the same manner as neurotransmitters, primarily norepinephrine, on a number of physiological functions, especially blood pressure. A combination of MAO inhibiting drugs with many ordinary foods that contain tyramines is a sure recipe for hypertensive shock and death.

Usually, red wine, chocolate, and cheeses are given as examples of foods containing tyramines, but tyramines can occur in many other foods as well. Also, the tyramine content of foods is difficult to predict. The content of tyramines in many foods tends to increase with storage. In a fresher state, many different kinds of food have a lower (or insignificant) content of tyramines, while after having been stored for some time, the contents of tyramines are higher. There are very long and explicit lists on tyramine contents in specific foods, compiled for patients who have to take MAO inhibitors to control Parkinson's.

Obviously, the above is not a complete characterization of chairman MAO and MAO inhibitors. For example, we have not discussed the difference between MAO-A and MAO-B, as well as the effects of MAO on behavior (low levels of MAO are associated with criminal behavior as well as with a polygamous lifestyle). Nevertheless, the above may already give the reader an idea why it is very unlikely that with a prescription medication such as yohimbine, there wouldn't be an explicit warning if it were a MAO inhibitor.

Yohimex is one of several brands of yohimbine tablets sold in the US. Yohimex is a prescription drug with 5.4 milligram of yohimbine hydrochloride as the active ingredient, manufactured by Jones Medical Industries in Canton, OH 44702, and distributed by Kramer Laboratories in Miami FL 33174. As Yohimex is a prescription drug, it had to be reviewed by the FDA. It's hard to believe that if yohimbine were indeed a definite MAO inhibitor, a specific note on the subject matter would be missing from the brochure accompanying every bottle of Yohimex.

Alas, the package literature contains no reference claiming that yohimbine would be a MAO inhibitor. The package literature has the following to say about the clinical pharmacology of yohimbine hydrochloride:

"Yohimbine blocks presynaptic alpha-2 adrenergic receptors. Its action on peripheral blood vessels resembles that of reserpine, though it is weaker and of short duration. Yohimbine's peripheral autonomic nervous system effect is to increase parasympathetic (cholinergic) and decrease sympathetic (adrenergic) activity. It is to be noted that in male sexual performance, erection is linked to cholinergic activity and to alpha-2 adrenergic blockade which may theoretically result in increased penile inflow, decreased penile outflow or both. Yohimbine exerts a stimulating action upon the mood and may increase anxiety. Such actions have not been adequately studied or related to dosage although they appear to require higher doses of the drug".

No word on MAO inhibition. The Mosby RxList website also does not mention yohimbine as MAO inhibitor.

(Reserpine is a white to yellowish powder isolated from the roots of

certain species of Rauwolfia and used as a sedative and an antihypertensive.)

Well, yohimbine and yohimbe are not exactly the same. Yohimbe is the raw tree bark, and yohimbine is just one of its active ingredients that has been extracted. Even if yohimbine is not a MAO inhibitor, it may still be the case that yohimbe is.

We have seen a number of web sites that claim that either yohimbine or yohimbe is a MAO inhibitor, or that yohimbine isn't but yohimbe is.

However, we haven't seen any conclusive study on yohimbe and MAO inhibition. If yohimbe were a strong and definite MAO inhibitor, one would have to expect fatalities if the usual precautions against tyramine-containing foods were not heeded. Any herb that functioned as a definite MAO inhibitor would long ago have been classified as a poison. But yohimbe has been sold as a supplement for years. If incidences of death would have occurred after ingesting yohimbe because of yohimbe being a MAO inhibitor, it's unlikely this fact would not be reported widely. Alas, there are no widely circulating reports of yohimbe causing deaths because of its effects as MAO inhibitor.

Sure, yohimbe and yohimbine cause side effects, which could be interpreted as an effect of MAO inhibition, mainly nervousness. But yohimbe usually does not cause an increase in blood pressure.

A safe assessment is that even if both yohimbine and yohimbe are not definite MAO inhibitors, they shouldn't be taken together with MAO inhibitors. I would add that people who are on MAO inhibition medication are anyway not physically well enough to take an additional leisure medication as strong as yohimbe or yohimbine.

Now, while yohimbe and yohimbine are not MAO inhibitors to the extent in which the term "MAO inhibitor" is pharmacologically understood, there is nevertheless some correlation between yohimbine and MAO activity.

It has been documented that yohimbine is an anxiogenic agent, a substance that can induce anxiety in humans and other higher animals. The Yohimex package literature states: "Yohimbine exerts a

stimulating action upon the mood and may increase anxiety. Such actions have not been adequately studied or related to dosage although they appear to require higher doses of the drug."

Anxiety is the missing link between yohimbine / yohimbe and MAO inhibition, and it points to a possible explanation why yohimbine / yohimbe act as aphrodisiacs, apart from facilitating erections.

In 1996, a study on the effects of some anxiogenic agents on brain monoamine oxidase inhibitory activity was conducted at the Department of Pharmacology, Banaras Hindu University, Varanasi, India (Bhattacharya SK; Chakrabarti A; Sandler M; Glover V). The study was done on rats, not on humans, as it involved dosages of yohimbine far too high to be used for sexual stimulation. The study came to the conclusion that in a state of anxiety induced by a sufficiently high dosage of yohimbine, there has been a noticeable increase of MAO-inhibitory activity without specific MAO-inhibitory pharmaceutical agents having been added.

This is of course not surprising as in any stress situation, there will likely be increased epinephrine (adrenaline) activity in any higher animal. Epinephrine activity in the body is regulated twofold: as secretion and as deactivation through chairman MAO. Additional secretion and inhibition of deamination by chairman MAO have comparative effects: an increased epinephrine level, with the typical stress-related symptoms.

A reasonable hypothesis regarding the aphrodisiac properties of yohimbe and yohimbine would probably have to consider the effect of the bark and its active ingredient on the neurotransmitter dopamine. While the usual aim of any treatment with MAO inhibitors is to raise levels of dopamine to control Parkinson's disease, it has been noted that raised dopamine levels normally also bring about sexual agitation.

The link between dopamine and sexual urge is so strong that scientific studies have been undertaken to check to what extent measurable dopamine levels correlate to sexual perversion (paraphilic disorder).

A 1995 research on "Dopamine and sexual behavior" at the Bernard

B. Brodie Department of Neuroscience, University of Cagliari, Italy, came to the following result: “Despite some differences, most studies show that treatments that increase or decrease, respectively, brain dopaminergic activity improve or worsen, respectively, several parameters of copulatory activity, supporting a facilitatory role of dopamine in male sexual behavior.”

And a 1997 study at the Harvard Medical School in Boston on “A monoamine hypothesis for the pathophysiology of paraphilic disorders” drew the following conclusion:

“A monoamine pathophysiological hypothesis for paraphilias in males is based on the following data: (i) the monoamines norepinephrine, dopamine, and serotonin are involved in the appetitive dimension of male sexual behavior in laboratory animals; (ii) data gathered from studying the side effect profiles of antidepressant psychostimulant, and neuroleptic drugs in humans suggest that alteration of central monoamine neurotransmission can have substantial effects on human sexual functioning, including sexual appetite; (iii) monoamine neurotransmitters appear to modulate dimensions of human and animal psychopathology including impulsivity, anxiety, depression, compulsivity, and pro/antisocial behavior, dimensions disturbed in many paraphiliacs; (iv) pharmacological agents that ameliorate psychiatric disorders characterized by the aforementioned characteristics, especially central serotonin enhancing drugs, can ameliorate paraphilic sexual arousal and behavior.”

The study refers to the well-known fact that many medications for Parkinson’s disease, which all aim to increase levels of dopamine, have an increased sexual appetite as a common side effect. Many, but not all Parkinson’s medications are MAO inhibitors. If scientific studies were to be undertaken on any aphrodisiac effect of yohimbine or yohimbe (apart from their well-documented effect of making better erections), they would have to check on what effect yohimbine and yohimbe have on dopamine levels, either through MAO modulation or via any alternative pathway.

MAO inhibitors, generic names and brand names:
benmoxin – Nerusil, Neuralex
echinopsidine iodide – Adepren
etryptamine – Monase

iproclozide – Sinderesin, Sursum
iproniazid – Iprozid, Ipronid, Marsilid, Rivivol, Propilniazida
isocarboxazid – Enerzer, Marplan, Marplon
mebanazine – Actamol
metfendrazine – H.M.-11
moclobamide – Aurorix, Manerix (reversible inhibitor)
nialamide – Espril, Isalazina, Mygal, Niamid, Niaquitil, Nuredal, Psicomidina, Surgex
pargyline – Eudatine, Eutonyl, Tenalin
phenelzine – Nardil, Stinerval, Monofen, Fenelzin, Kalgan, Nardelzine
pheniprazine – Catron, Catroniazide, Cavodil, Fenizin
phenoxypropazine – Drazine
pivhydrazine – Neomarsilid, Tersavid
safrazine – Safra
selegiline, l-deprenyl – Eldeprine, Eldepryl, Jumex, Jumexal, Lesotal, Movergan (selective MAO-B inhibitor)
toloxatone – Hymoryl, Perenum (selective MAO-A inhibitor)
tranylcypromine – Parnate, Sicoton, Transamin, Transapin, Tylciprine