



## I Want To Know!

### Questions And Answers On Calcium, Ortho•Eyes & Pyridoxamine.

**Q** AOR emphasizes the importance of its use of calcium hydroxyapatite in its bone supplements. I recently saw an ad in a popular health magazine which indicated that calcium hydroxyapatite isn't even as good as calcium carbonate at slowing bone loss, and was much less effective than a new form of calcium. Can you comment?

**A** There are two things to note regarding the alleged results of the 'study' reported in the ad you enclosed. First, there is no such study published in the medical literature as indexed by MEDLINE, the National Library of Medicine's medical database of over 15 million citations. Likewise, while a visit to the manufacturer's website provides a link to what are described as "published research articles," few of the articles are actually published in any medical journal –



and none of them compare this new calcium form to "calcium hydroxyapatite." We even contacted the company that placed the ad to ask them where the supposed "data" came from; they said they didn't know! [Note: since this article was originally written, the website has been temporarily shut down, following a Federal Trade Commission investigation into the company and its ultimate conviction for making unsubstantiated claims for some of its other products].

In any case: even if such a trial really does exist, and the results are exactly as shown on the graph, it actually tells you nothing about the efficacy of *ossein microcrystalline hydroxyapatite complex (MCHC)* – the calcium source used in AOR's new **Ortho•Bone™** and **Bone Basics™**. As we have explained in past issues of *Advances*, "**calcium hydroxyapatite**" is **not the same as MCHC!** "Calcium hydroxyapatite" – also known as "calcium orthophosphate" – is a *synthetic calcium salt*, whereas MCHC is a natural, calcium-containing *bone nutrient complex*, which contains a variety of growth factors, mucopolysaccharides, and peptides in addition to its calcium content. These nutrients are not found in calcium hydroxyapatite.

**True MCHC consistently halts, or even reverses, bone loss in controlled human clinical trials.**

Many studies have confirmed that, whereas conventional calcium supplements – such as calcium gluconate, calcium citrate, calcium carbonate, and even calcium citrate-malate – can only *slow* menopausal bone loss, whether taken alone or with vitamin D,<sup>1-14</sup> **true MCHC consistently halts, or even reverses, bone loss in controlled human clinical trials.**<sup>11-17</sup> When compared against other calcium supplemental forms, MCHC consistently trumps the conventional calcium supplement in its effects on parameters important to bone health.<sup>11-14,17-22</sup>

Importantly, studies show that neither calcium hydroxyapatite, nor MCHC which has been heat-treated to destroy its rich nutrient matrix, have the same effects on bone as true, intact MCHC.<sup>19-22</sup> Therefore, it is hardly surprising that calcium hydroxyapatite would not deliver on MCHC's promises: it is in no way a comparable supplement.

Regarding the new form of calcium hyped in the ad to which you refer: this is a form of calcium (called "active absorbable algal calcium" (AAA-Ca in the scientific literature, but also sold under a trade name) derived from heated oyster shells and bound to organic matter from seaweed. Although a lot of claims are made for this form of calcium, it is backed by very little scientific research. As we noted a moment ago, much of the so-called "published research" cited in promotional material on this product has *not* been published in any medical journal – it has not, in

other words, managed to pass the scrutiny of the peer-review process of science.

As far as we can tell from searching the MEDLINE database and the company's website, there is exactly one published clinical trial on this material's effects on bone density in comparison with other calcium forms,<sup>23</sup> and those results have been rehashed twice.<sup>24,25</sup> This study compared the heated oyster/seaweed calcium product to calcium carbonate, and did indeed find the AAA-Ca product to be superior. However, the study has to be interpreted cautiously. For one thing, it involved very few women: there were less than *twenty* subjects in each group! For another thing, it is only *one* study. By contrast, there are multiple controlled trials demonstrating the superior bone-health effects of MCHC;<sup>11-17</sup> these trials involved many patients, and have explored MCHC's effects in women whose osteoporosis has a variety of different origins. In short: we can be confident of MCHC's benefits in women's bones; we have very little idea of the effects of the oyster/seaweed material.



In short, while there is some interesting preliminary information available about the new calcium source, **there appears to be no reliable evidence that the heated oyster shell/seaweed calcium source is any better than calcium carbonate.** There is also no evidence that it is better than MCHC, which remains, on the basis of the primary medical research, the best calcium supplement for bone health.

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Other studies involving AAA-Ca seem a little bit pointless. One study, for example, tested the oyster/seaweed

calcium product on back and joint pain, and found that it did indeed improve measures of both subjective pain and electrical impedance (a surrogate measure of neurological pain levels) in response to exercise loads like standing up, squatting, or climbing stairs.<sup>26</sup> This might suggest some kind of effect of AAA-Ca on skeletal or joint health – except that the women receiving the oyster/seaweed calcium supplement were all *also* taking 3500 milligrams per day of a glucosamine-containing collagen and matrix supplement, which of course is well-demonstrated to improve joint pain *all by itself*.

Another study is cited as showing that AAA-Ca is better absorbed than calcium carbonate;<sup>27</sup> unfortunately, this study relied on *urinary excretion* of calcium to determine calcium absorption. It has now been established that this is an unreliable method of measuring bioavailability.<sup>28</sup>

It's also curious that *all* of the studies on AAA-Ca that we could find in the medical literature were performed by the *same group* of Japanese investigators. No *independent* studies appear to have been allowed into any peer-reviewed, scientific forum.

**Q** I have noticed a burning sensation after using your eye drops, is this normal?

**A** The burning sensation you feel comes from the pH of the eye drop solution. Our eyes have a normal pH of around neutral - 7.0 to 7.2. Lubricating eye drops usually have a pH similar to the normal eye pH. There is little stinging at such a pH level. Unfortunately, **there is little penetration of the active ingredients at a neutral pH<sup>29</sup>** - this is not a problem with lubricating eye drops because no active ingredient is being delivered to the eye.

The layered character of the cornea is the main barrier to the penetration and successful delivery of active ingredients.<sup>30</sup> There are a few ways to improve penetration through the cornea, adjustment of the acidity of the solution is one of them. **A more acidic solution leads to the inhibition of gap junctions in the corneal epithelium, which increases delivery.**<sup>31</sup> The lower the pH of the eye drops, the better the penetration of the active ingredients through the cornea. With medical eye drops intended to distribute an active ingredient to the eye, the pH can be as low as 5 to increase the penetration of the active ingredient through the cornea. There is significant stinging associated with such a low pH but there is usually a serious underlying condition and patients comply anyway. Slightly acidic solutions are not harmful to the eyes and tests have demonstrated that 30-second contact with hydrochloric acid at a pH of 1.28 produced no ocular damage in animals.<sup>32</sup> **After testing, the pH of the solution in Ortho Eyes™ was adjusted to offer adequate delivery while keeping the stinging to a minimum.** Such a compromise was obtained with a pH of 6.3-6.4, whereupon most people will feel no stinging.

# Q

When will Pyridoxamine be available in the US?

# A

Melatonin, IP6, DHEA, vitamin K, boron, lithium... and the list goes on... where all either available in the US first or are still exclusively available to Americans. However, there is one exception: Pyridoxamine. **This novel molecule is now considered a prospective drug for the treatment of diabetic neuropathy<sup>33</sup> and cannot be sold as a supplement in the United States.** Quite a shame for our southern neighbors; the molecule has created quite a buzz in anti-aging circles and holds promise for diabetics. It is the latest tool available to prevent the formation of advanced glycation end-products and advanced lipoxidation end-products, two detrimental reactions that lead to tissue dysfunction and aging.<sup>34</sup> The benefits do not end there: this B6 vitamin reduces free radical formation, protects the vascular system, and inhibits retinopathy and neuropathy.<sup>35,</sup>

36, 37

**Pyridoxamine has the truly exceptional ability to prevent protein glycation further down this destructive pathway than any other molecule.** This is a remarkable ability which has earned this new form of vitamin B6 the ranking of experimental drug, thereby depriving Americans of this molecule for the time being...

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