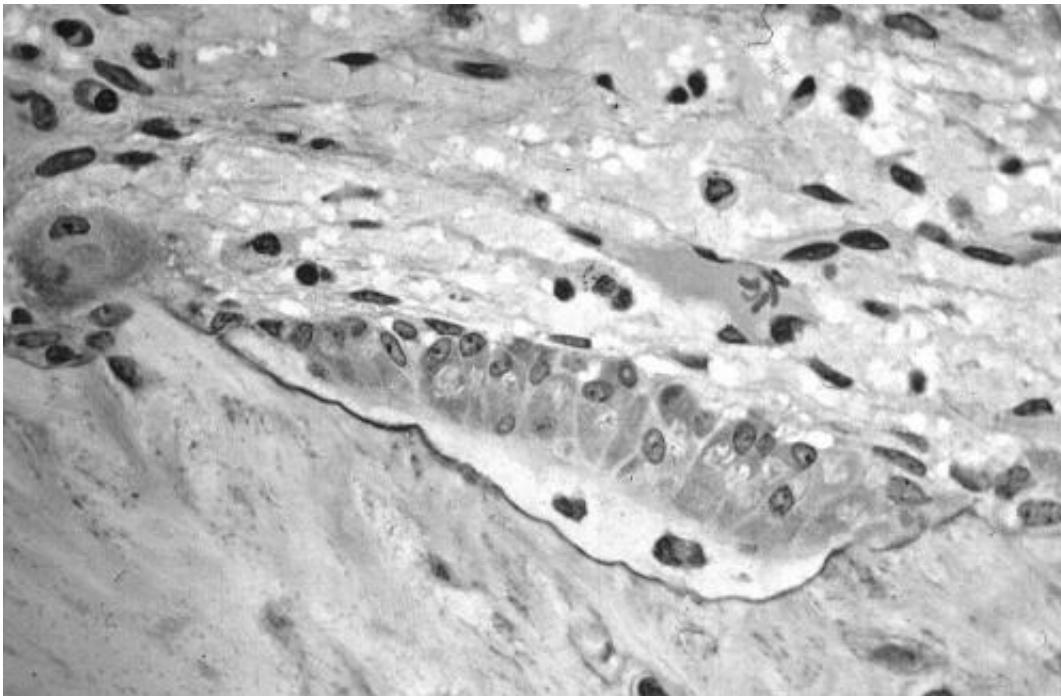


New osteoporosis treatment uses traditional Chinese herb to prevent bone loss

August 29 2017



Osteoblasts actively synthesizing osteoid. Credit: Robert M. Hunt; Wikipedia.

An herb widely used in traditional Chinese medicine might hold the key to a new osteoporosis therapy that could prevent bone loss without causing side effects.

Using a compound derived from red sage, UBC researchers have found a way to selectively block an enzyme called Cathepsin K (CatK), which plays a major role in the breakdown of collagen in bones during

osteoporosis. The findings were published today in the *Journal of Bone and Mineral Research*.

"The development of osteoporosis drugs by pharmaceutical companies has focused heavily on blocking CatK in recent years," said Dieter Brömme, a professor in the faculty of dentistry and a Canada Research Chair in Proteases and Disease. "All clinical trials to date have failed due to side effects ranging from stroke, skin fibrosis and cardiovascular issues. We've found a way to block CatK only in [bone tissue](#) that we think will prevent these other negative effects."

The researchers tested a compound derived from red sage in human and mouse bone cells and a mouse model. They found that it prevented bone loss and increased the bone mineral density of the mice treated with the compound by 35 per cent, when compared with the control group.

The study builds on previous research by Brömme and his team that looked at the effectiveness of red sage, known as Danshen in Chinese and used to treat bone ailments, in stopping the activity of CatK in limited ways.

Enzyme blockers work like keys in locks. Most drugs in development have been so called active site-directed inhibitors, which act like master keys and lock the entire enzyme, blocking both its disease-relevant functions such as collagen degradation and its other normal functions.

"CatK is a multifunctional enzyme with important roles in other parts of the body and we think completely blocking it is what causes unexpected side effects in other drugs," said Preeti Panwar, a research associate in the Brömme lab. "Our compound only locks the collagen -degrading CatK activity, preventing the unregulated breakdown of collagen in bones without any other negative impacts."

The treatment could also potentially be used to treat a variety of other bone and cartilage diseases such as arthritis and certain bone cancers.

Osteoporosis is a global health problem that will affect one out of three women and one of out five men worldwide, with a multi-billion-dollar pharmaceutical industry dedicated to finding treatments to stop its progression.

More information: Preety Panwar et al, An Ectosteric Inhibitor of Cathepsin K Inhibits Bone Resorption in Ovariectomized Mice, *Journal of Bone and Mineral Research* (2017). [DOI: 10.1002/jbmr.3227](https://doi.org/10.1002/jbmr.3227)

Provided by University of British Columbia

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