

WHAT DO BONES AND EGGSHELLS HAVE IN COMMON?

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1. Calcium
2. Phosphorus
3. Amount of organic matrix
4. Osteopontin

The answer to this quiz is calcium and osteopontin. The mineral in bone is calcium phosphate, while the mineral in eggshells is calcium carbonate.

The feature which distinguishes the calcium phosphate in bone from the calcium phosphate found in mineral deposits is the organic matrix of bone.

The same is true when compar-

ing limestone with eggshell. However, there is a big difference in quantity of organic matrix: it is 50 percent of bone while only four percent of the eggshell. Although four percent may sound like a trivial quantity, the organic matrix of eggshell organizes the calcium carbonate crystals in a structure quite different from that observed in limestone.

The major component of the organic matrix of bone is a protein called collagen. Gelatin, a food product, is boiled collagen. However, in bone, collagen is in the form of fibers which have a characteristic structure when examined under the microscope.

In recent years, a major thrust in bone biology research has been the discovery of minor constituents of the organic matrix of bone. These proteins (of the minor constituents group) have been given neat names such as osteonectin, osteocalcin,

and osteopontin. These are considered important regulators of bone metabolism.

For example, osteopontin may attract osteoclasts (bone-destroying cells) like honey attracts bees. Thus, when osteopontin is exposed on the surface of bone, it acts as a docking site for the osteoclast to start digesting bone.

It turns out that osteopontin is another likeness between bones and eggshells. Recent research in Israel has shown that it is a major component of the organic matrix of eggshell. Furthermore, cells in the shell-forming region of the oviduct make and secrete this protein only when an egg is present in the oviduct.

In addition to shell strength, osteopontin may be playing an important role in embryonic development. Here is how! As you might suspect, calcium is essential for embryonic development. During the first 10 days of the 21-day incubation period, the embryo obtains its calcium from the egg yolk. However, as the bones start to calcify, the yolk is unable to supply this increased demand, so the embryo starts to obtain calcium from the eggshell.

Osteoclast-like cells associated with the chorioallantoic membrane

Peach, Nectarine Producers Vote To Increase Assessment

HARRISBURG (Dauphin Co.) — Agriculture Secretary Charles C. Brosius has announced the results of a referendum to increase the assessment rate for producers of peaches and nectarines in Pennsylvania.

"The Pennsylvania Peach and Nectarine Research Program provides funding for research on new varieties, and on pests that affect fruit production," Brosius said. "I'm pleased that our producers have voted to increase their level

of support for this important program."

Persons who produce, grow, or cause to be produced or grown 500 or more peach and/or nectarine trees were eligible to vote for the amendment. The positive vote means an increase in the rate of assessment from \$3 per acre to \$5 per acre for each affected producer.

Of the 53 eligible ballots that were cast, 38 (71.7 percent) were marked "in favor" and 15 (28.3 percent) "against" the amendment. Producers voting in favor of the amendment represented 2,069.9 acres or 78.8 percent of the total acreage of the producers voting, and producers voting against the amendment represented 558.5 acres of 21.2 percent of the total acreage of producers voting. Three spoiled and ineligible ballots were received.

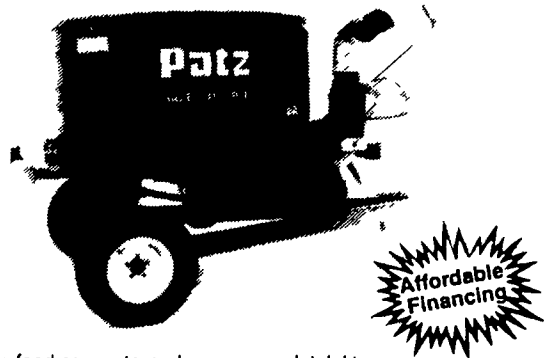
Because a majority of the votes by number and by volume were cast in favor of the amendment of the program, the Pennsylvania Peach and Nectarine Research Program has been amended to reflect the \$5 per acre assessment beginning with the current marketing season.

dissolve the inner layers of the eggshell, releasing calcium and making it available to sustain embryonic bone mineralization. We would predict that osteopontin in the shell matrix is the compound attracting the shell-dissolving cells.

Although bone and eggshells differ in many ways, they share two features: calcium and osteopontin. The calcium serves as a source of blood calcium which is essential for life, while osteopontin serves as the attractant for the cells which make the calcium available for maintaining serum calcium.

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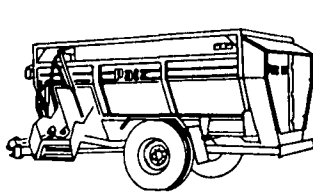
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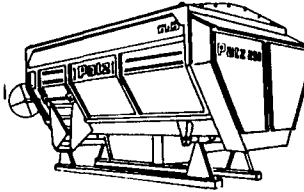
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