

Blockers for Crystallization Centers

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Abstract

This work presents theoretical solutions for blocking places where harmful mineralization of tissue and organs develops. Blocking such places and removal of crystallization centers will help with further healthy functioning of tissue and organs which cannot function properly when affected by biomineralization.

Keywords: *Blockers; Crystallization Centers*

Introduction

Biomineralization of bodies, including the human body, can be necessary or harmful.

Necessary biomineralization includes mostly mineralization of bones during puberty as well as in the process of healing broken bones.

Harmful mineralization of tissue and organs may be inorganic (phosphates, carbonates, oxalates) or organic (concentrations of cholesterol, fats, lipids, etc [1-19]). Two elements are necessary for development of each type of harmful biomineralization in tissue or organs: places where the biomineralization starts (crystallization centers) and substances that can “crystallize” in those crystallization centers. Presence of only one of those elements is not enough for tissue and organ biomineralization to develop.

In necessary biomineralization, there are crystallization centers of bone apatite in bone collagen. Their creation is programmed in our genes. In those centers carbonate hydroxyapatite crystallizes from alkaline phosphatase. The result is creation of compact protein-mineral structure with high elasticity but also mechanical resistance.

Centers of harmful mineralization are places where biological structures are damaged. They can be genetic or develop during life and aging of the body, but they work in the same way regardless of their origin. Due to the damage in biological structures, there are electric fields resulting from damage to interatomic bonds in the crystallization centers. They work like a magnet, attracting nearby charged ions. The ions may be both organic (cholesterol) and calcium cations, phosphate ions, etc. Ions attracted to the crystallization center start creating local biomineralization.

When biomineralizing particles “saturate” local charges of the crystallization centers, the crystallization stops at certain level. When the electrical potential is not saturated, i.e. the center does not become “electrically” inactive, biomineralization keeps growing.

In addition to crystallization centers that result from genetic faults, there are those created mechanically through tissue damage. Specifically, they are created as a result of mechanical breaking of interatomic bonds in tissue structures. Another factor that impacts creation of the centers is inflammation caused by infections. Toxins secreted by pathogenic microorganisms damage tissue and organs. Those damaged places become crystallization centers. Some examples of that are calcifications of lungs or heart valves (Figure 1) after infections.

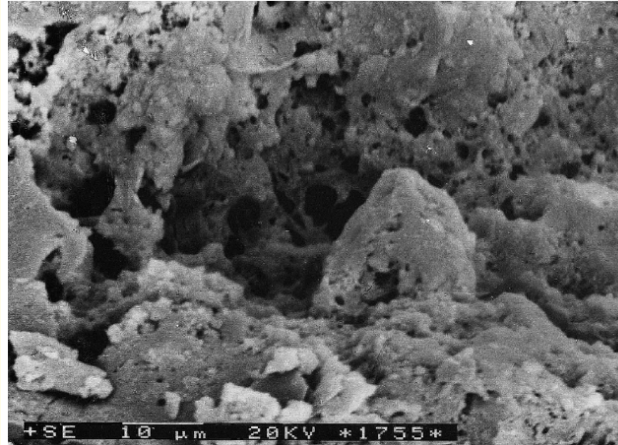


Figure 1: Surface of damaged aortic valve. Damaged spots are centers of potential crystallization. Scanning microscope. Magnification according to scale.

Some of the factors that favor damage to tissue and organs are pollution, certain chemicals used by the food industry, etc. Therefore, tissue damage, and resulting development of crystallization centers, may be the result of one or many coexisting factors. Hence tissue biomineralization may appear random because it develops in multiple places.

Substances crystallizing in crystallization centers, i.e. causing both inorganic and organic tissue biomineralization, can be of different origin. Calcium that occurs in blood plasma in the form of Ca^{2+} ions may come from the digestive system or from bones. Cholesterol that crystallizes in arteries, among other places, may be the product of transformation of one of bile acids produced by the liver or it may come from the outside, from food, etc.

Considering all of the above causes of crystallization centers creation as well as the exceeding number of factors causing tissue and organ biomineralization, we arrive at an enormous number of combinations. We observe it as extraordinary complexity of tissue biomineralization. The problem is further complicated by mixed biomineralization, i.e. simultaneous organic and inorganic mineralization. A good example of that is so called atherosclerotic plaque, which, in addition to calcifications, contains also cholesterol or fats.

One of the ways to fight biomineralization is to fight dysfunction of the organs determining excess of substances that biomineralize crystallization centers. That means, for instance, fighting liver dysfunctions that result in excess of cholesterol in blood. Another example is normalization of thyroid and parathyroid function, which determines calcitonin and parathyroid hormone production, leading to stabilization of Ca^{2+} levels.

Another way to fight tissue and organ biomineralization may be prevention, i.e. stopping it from developing entirely. There is a number of methods that can potentially eliminate factors that favor tissue damage. One of them is certainly quick elimination of infections (e.g.

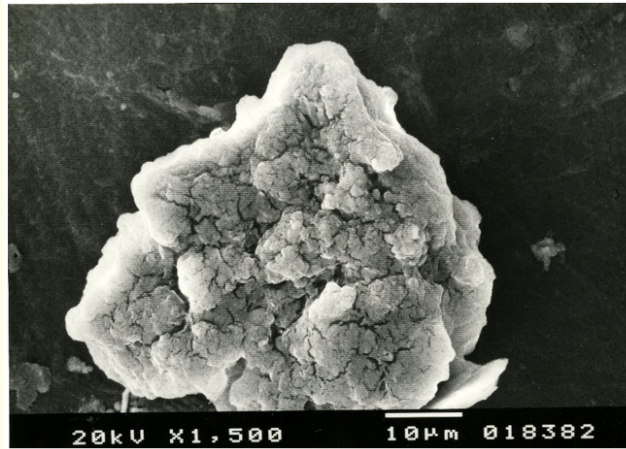


Figure 2: Cholesterol-apatite aggregation that crystallized on endothelium of femoral artery. Scanning microscope. Magnification according to scale.



Figure 3: Cholesterol crystals in a damaged structure of an aortic valve leaflet of a heart. Scanning microscope. Magnification according to scale.

using antibiotics), reducing the amount of toxins secreted by pathogenic microorganisms. This way, damage to the tissue, which would result in creation of crystallization centers, is reduced.

However, what can we do when the centers of harmful crystallization are already present? It appears that it might be possible to try and block those centers, i.e. deprive them of electrical charges. Such action could be compared to patching holes in tires. Administration of the right type of substance may deliver a compound to the crystallization center that would turn off the possibility of its biomineralization.

Studies of damaged arterial walls indicate that the body repairs the damage itself. The damaged areas of the arterial wall and endothelium are covered with microstrands of collagen (Figure 4). It suggests that it is possible to use suitably prepared collagen to eliminate damage in tissue (crystallization centers).

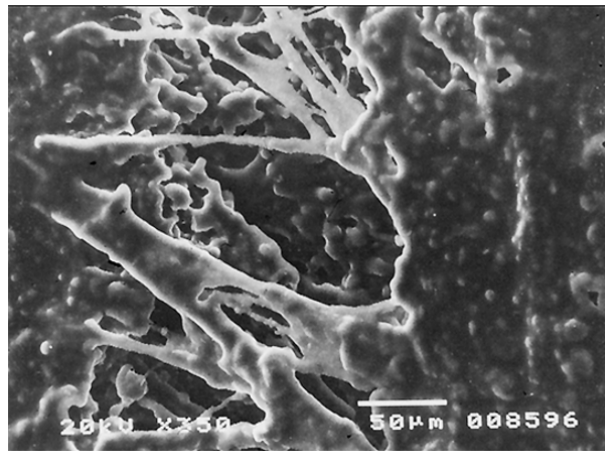


Figure 4: Damaged area of inner wall of abdominal artery self-repaired with autogenic collagen strands. Scanning microscope. Magnification according to scale.

The idea presented here requires thorough study. Properly prepared (activated) collagen administered intravenously as a very diluted suspension may crystallize in crystallization centers and “repair” damaged tissue.

Conclusion

Conducted research indicates that tissue biomineralization, including biomineralization of arteries, appears in damaged areas that become crystallization centers. Fight against tissue biomineralization should include not only reducing the substances that can crystallize in those crystallization centers, but also clearing the crystallization centers themselves. Finding a way to block crystallization centers is as important as reducing the levels of substances that mineralize tissue, including arteries. That, however, requires further research.

Disclosure

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