Coughlan, Christine

From: Duffy, Gillian
Sent: Monday, 22 May 2017 10:51 AM
To: Fletcher, Nick; Berven, Leise
Cc: Fields, Barry
Subject: RE: Nano calcium phosphate and hydroxyapatite [SEC=UNCLASSIFIED]

Thanks guys

From: Fletcher, Nick
Sent: Monday, 22 May 2017 10:46 AM
To: Duffy, Gillian; Berven, Leise
Cc: Fields, Barry
Subject: FW: Nano calcium phosphate and hydroxyapatite [SEC=UNCLASSIFIED]

Thanks Barry

Not sure if you have seen this Leise/Gill

Nick

From: Fields, Barry
Sent: Monday, 22 May 2017 9:51 AM
To: Fletcher, Nick
Subject: Nano calcium phosphate and hydroxyapatite [SEC=UNCLASSIFIED]

Hi Nick – Was thinking about nano HA on the weekend (as you do) and came across the review below. Schoepf et al cite this review but don't mention the milk or nano aspects at all.

Barry

Dairy Sci Technol. 2015;95:3-14. Epub 2014 Jul 16.

A review of the biology of calcium phosphate sequestration with special reference to milk.

Lenton S, Nylander T, Teixeira SC, Holt C

Author information

Abstract

In milk, a stable fluid is formed in which sequestered nanoclusters of calcium phosphate are substructures in casein micelles. As a result, calcium and phosphate concentrations in milk can be far in excess of their solubility. Variations of calcium, phosphate and casein concentrations in milks, both within and among species, are mainly due to the formation of the nanocluster complexes. Caseins evolved from tooth and bone proteins well before the evolution of lactation. It has therefore been suggested that the role of caseins in milk is an adaptation of an antecedent function in the control of some aspect of biomineralisation. There is new evidence that nanocluster-type complexes are also present in blood serum and, by implication, in many other closely related biofluids. Because such fluids are stable but nevertheless supersaturated with respect to the bone and tooth mineral hydroxyapatite, they allow soft and mineralised tissues to co-exist in the same organism with relative ease. An appreciable concentration of nanocluster complexes exists in fresh saliva. Such saliva may stabilise tooth mineral and help to repair demineralised lesions. In the extracellular matrix of bone, nanocluster complexes may be involved in directing the amorphous calcium phosphate to intrafibrillar spaces in collagen where they can mature into oriented apatite crystals. Thus, evidence is accumulating that calcium phosphate sequestration by phosphopeptides to form equilibrium complexes, first observed in milk, is more generally important in the control of physiological calcification.