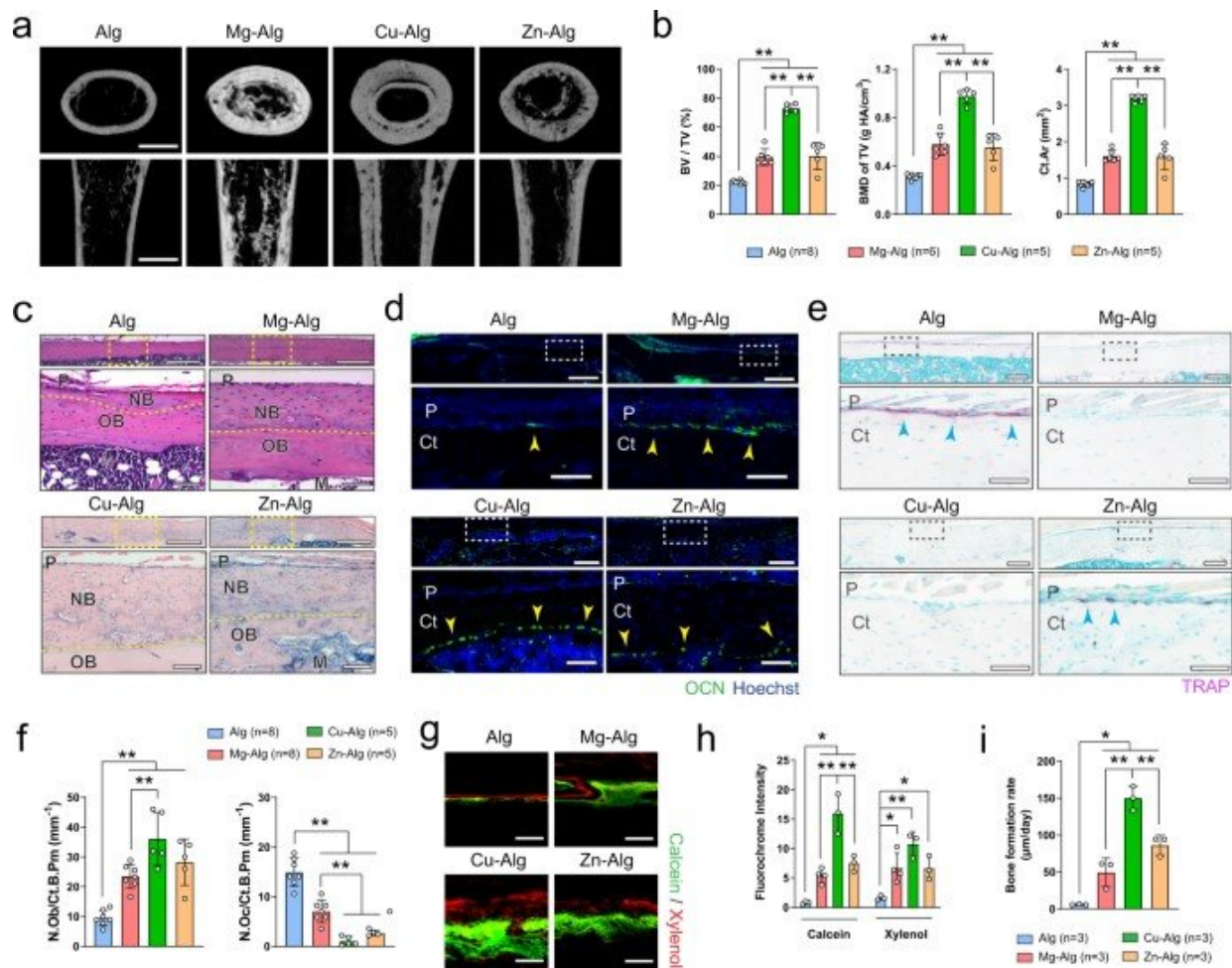


Bone tissue engineering: Divalent metal cations stimulate new bone formation

February 3 2022, by Thamarasee Jeewandara



Divalent cations released from alginate induce new bone formation. (a) Reconstructed micro-computed tomography (μ CT) images (scale bars = 1 mm) showing the new bone formation in mouse femurs grafted with Mg²⁺-, Cu²⁺-, or Zn²⁺-releasing alginate. Pure alginate grafted mice serve as control. (b) Corresponding measurements of bone volume fraction (BV/TV), bone mineral

density (BMD of TV), and cortical bone area (Ct.Ar). (c) Representative images of hematoxylin and eosin (H&E) staining showing periosteal new bone formation (n = 3). Lower images (scale bars = 100 μm) are high-resolution versions of the boxed regions in the upper images (scale bars = 500 μm). P, periosteum; NB, new bone; OB, old bone; M, marrow. d Representative immunofluorescent images showing the presence of osteocalcin+ (OCN+) osteoblasts on the cortical bone surface. Lower images (scale bars = 50 μm) are high-resolution versions of the boxed regions in the upper images (scale bars = 200 μm). P, periosteum; Ct, cortical bone. (e) Representative images of tartrate-resistant acid phosphatase (TRAP) staining showing the presence of TRAP+ osteoclasts on the cortical bone surface. Lower images (scale bars = 100 μm) are high-resolution versions of the boxed regions in the upper images (scale bars = 400 μm). (f) Histomorphological analysis of osteoblast (N.Ob/Ct.B.Pm) and osteoclast (N.Oc/Ct.B.Pm) numbers on the cortical bone surface. Representative images of calcein/xyleneol labeling showing periosteal new bone formation (g, scale bars = 100 μm), quantitative analysis of fluorescence intensity of calcein and xyleneol (h), as well as corresponding measurement of bone formation rate (i). Data are mean \pm standard deviation (s.d.) *P

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