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Human type H vessels are a sensitive marker of bone mass

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Vascularization is fundamental for bone formation and bone tissue homeostasis. However, in human subjects, a direct molecular relationship has not been identified between angiogenesis and agents that promote bone disease or factors related to age. Osteopenia is a condition in which bone mineral density (BMD) is lower than normal, and it represents a sign of normal aging. Here, we tested whether the type H vessel, which was recently identified as strongly positive for CD31 (also known as PECAM1, platelet/endothelial cell adhesion molecule 1) and endomucin (CD31hiEmcnhi) in mice, is an important indicator of aging and osteopenia in human subjects. We found that age-dependent losses of type H vessels in human bone sections conform to the observations in aged mice. The abundance of human type H vessels and osteoprogenitors may be relevant to changes in the skeletal microarchitecture and advanced osteopenia. Furthermore, ovariectomized mice, a widely used model for postmenopausal osteoporosis, exhibited significantly reduced type H vessels accompanied by reduced osteoprogenitors, which is consistent with impaired bone microarchitecture and osteoporosis, suggesting that this feature is an indicator of bone mass independent of aging. More importantly, oral administration of desferrioxamine (DFO) led to significantly increased bone mass via enhanced angiogenesis and increased type H vessels in ovariectomized mice. Altogether, these data represent a novel finding that type H vessels are regulated in aged and osteopenia subjects. The abundance of human type H vessels is an early marker of bone loss and represents a potential target for improving bone quality via the induction of type H vessels.

Biography

Liang Wang has completed his PhD from the Second Affiliated Hospital of Soochow University. He is an Orthopedic Surgeon and he has published lots of papers in this field.

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