

# Towards Improved Bone Regeneration

(C. A. Knuth)

1. Mesenchymal stem cells (MSCs) isolated from younger patients have enhanced proliferative and differentiation potential compared to MSCs isolated from older patients. (*this thesis*)
2. Varied differentiation potential between MSC donors greatly influences *in vivo* bone formation. (*this thesis*)
3. Hypertrophy associated collagen type X, found within the extracellular matrix of chondrogenically differentiated MSCs, is important for tissue engineered endochondral ossification. (*this thesis*)
4. Overall chondrogenic potential of an MSC donor will influence *in vivo* bone formation. (*this thesis*)
5. One week of chondrogenic priming of MSC pellets, in combination with fibrin, is sufficient for endochondral bone formation to occur *in vivo*. (*this thesis*)
6. Utilizing decellularised matrices derived from chondrogenic donors, shown to induce bone formation *in vivo*, presents a promising solution to donor variation. (*Bourguine, PE. PNAS, 2014*)
7. Donor MSC within these endochondral constructs could directly contribute to future bone formation. (*Bahney C.S., J Bone Miner Res. 2014*)
8. Determining how a fully functional immune system affects tissue engineered bone formation could further improve graft construction and clinical translation potential. (*Kiernan, CH. Tissue Engineering Part B, 2018*)
9. Research is to see what everybody has seen, and to think what nobody else has thought. (*Albert Szent-Györgyi*)
10. If you find from your own experience that something is a fact and it contradicts what some authority has written down, then you must abandon the authority and base your reasoning on your own findings. (*Leonardo Da Vinci*)
11. The value of an education ... is not the learning of many facts, but the training of the mind to think... (*Albert Einstein*)