

OBCD Bones

<https://journals.plos.org/plosgenetics/article?id=10.1371/journal.pgen.1002858>

<https://www.nature.com/articles/s41588-018-0302-x>

<https://www.nature.com/articles/ng.3949>

This was a collaboration with the Origins of Bone and Cartilage Disease (OBCD) project:

At the end of the pipeline, the left hind limb and tail bones from 2-6 female mutant and wild-type mice were collected at necropsy, fixed in 70% ethanol and stored at 4°C. Soft tissues were removed. Femurs and caudal vertebrae were imaged at 10µm pixel resolution (MX20, Faxitron) alongside standards to quantify relative bone mineral content and bone length.

Micro-computerised tomography (µCT-50, Scanco, Zurich, Switzerland) was used to assess cortical bone parameters (thickness, bone mineral density and medullary diameter) at 10µm voxel resolution. Trabecular parameters (bone volume, and trabecular number, thickness & spacing) were assessed at 5µm voxel resolution.

Biomechanical variables of bone strength and toughness were determined using an Instron 5543 load frame (Instron Limited, High Wycombe, UK). Femur yield load, maximum load, fracture load, stiffness and toughness were assessed by destructive three-point bend testing; and caudal vertebrae (6 and 7) yield load, maximum load, and stiffness by compression testing.

Overall, 19 bone parameters were reported for each mouse and compared to reference data obtained from >350 16-week wild-type C57BL/6 female mice.

The age at which the mice were culled, the anaesthetic used and the diet the mice were fed were all pipeline dependent.