

## Description of Additional Supplementary Files

**File name:** Supplementary Movie 1

Video of newborn (D0) fat-tailed dunnart (*S. crassicaudata*) in culture medium.

**File name:** Supplementary Movie 2

MicroCT volume rendering of a D0 dunnart (*S. crassicaudata*) showing sagittal slices from right to left.

**File name:** Supplementary Movie 3

MicroCT volume rendering of a D30 dunnart (*S. crassicaudata*) showing sagittal slices from right to left.

**File name:** Supplementary Movie 4

MicroCT volume rendering of a D35 dunnart (*S. crassicaudata*) showing sagittal slices from right to left.

**File name:** Supplementary Movie 5

MicroCT volume rendering of a D40 dunnart (*S. crassicaudata*) showing sagittal slices from right to left.

**File name:** Supplementary Movie 6

MicroCT volume rendering of a D50 dunnart (*S. crassicaudata*) showing sagittal slices from right to left.

**File name:** Supplementary Movie 7

MicroCT volume rendering of a D60 dunnart (*S. crassicaudata*) showing sagittal slices from right to left.

**File name:** Supplementary Data 1

**Description:** Details of specimen collection, preparation and microCT scanning parameters.

**File name:** Supplementary Data 2

**Description:** Rankings for the onset of ossification in the skull of *S. crassicaudata* pouch young.

**File name:** Supplementary Data 3

**Description:** Rankings for the onset of bone contacts in the skull of *S. crassicaudata* pouch young.