**Supplementary Figure S1. Fluorescently-labelled bisphosphonate is present in the macrophage-rich region of 4T1 mammary tumours *in vivo*.** 4T1 tumour-bearing mice were subcutaneously injected with a single dose of the N-BP AF647-RIS, then the mammary tumours were excised after 24 hours. The N-BP was clearly present in whole tumour explants (A) or in the tumour margin (arrows) in frozen sections (B). (C) Two-photon imaging of tumours revealed the presence of AF647-RIS (red) in cells located in and beneath the tumour capsule (white = collagen). (D) The margin of 4T1 mammary tumours is rich in F4/80+ macrophages, detected by immunohistochemical staining (LN = lymph node, scale bar = 2mm). The boxed region in (D) is enlarged in (E), scale bar = 100μm.
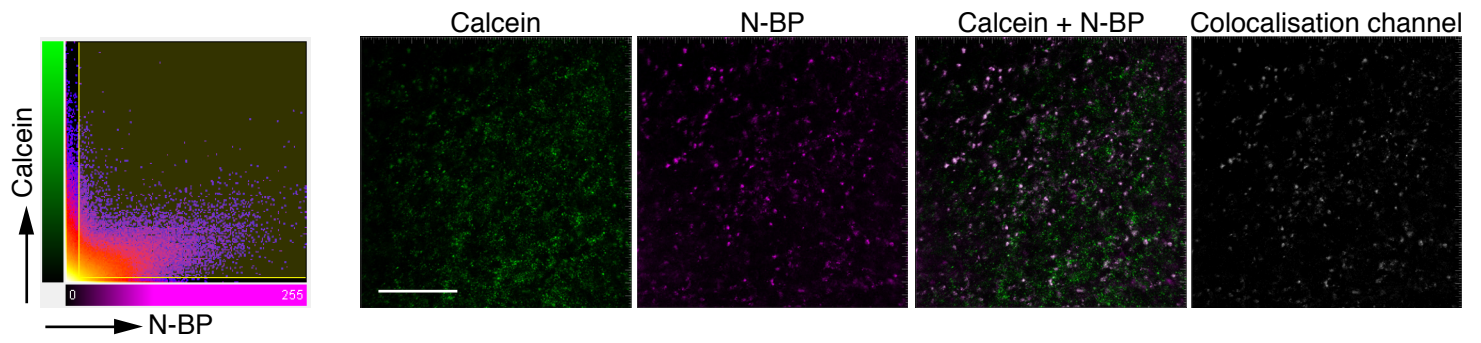
Supplementary Figure S2. **N-BP colocalises with microcalcifications, detected by calcein labelling in 4T1 mammary tumours.** Colocalisation scatter plot and representative images of calcein (green), N-BP (OsteoSense 680; magenta), overlay of calcein and N-BP, and the colocalisation channel showing pixels with both calcein and N-BP signal. Scale bar = 100μm.
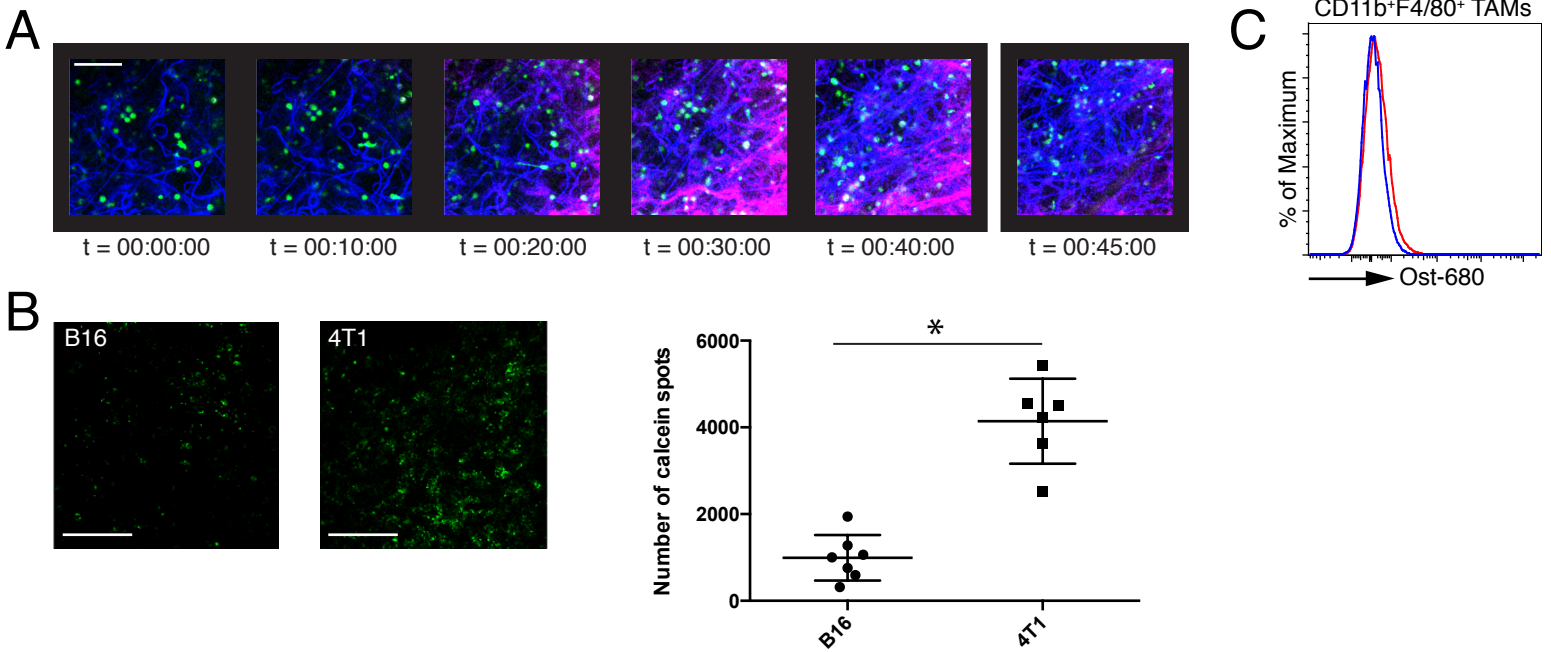
Supplementary Figure S3. TAMs do not take up N-BP as efficiently in the B16.F10 melanoma model compared to the 4T1 mammary tumour model. (A) Time-lapse images of a single optical section from B16.F10 melanoma tumour imaged by intravital two-photon microscopy, showing less vascular leakage of OsteoSense 680. Blue = collagen (SHG), green = F4/80, magenta = OsteoSense 680. Time stamp indicates hh:mm:ss after injection of OsteoSense 680. (B) Lower abundance of microcalcifications in B16.F10 melanomas compared to 4T1 mammary tumours. Microcalcifications were detected using *in vivo* calcein labelling followed by explant imaging of tumours by two-photon microscopy and quantification of calcein-labelled calcifications using the spot detection function in Imaris, from multiple B16 melanoma and 4T1 mammary tumours (n=4 tumours per group with 1-2 independent z-stacks analysed per tumour, p<0.0001). Scale bars = 100μm. (C) Flow cytometric analysis showed barely detectable uptake of OsteoSense 680 by TAMs (CD45+CD11b+F4/80+) but not by other cell types. Data show a representative histogram of OsteoSense 680 uptake, n=4 tumours per group.