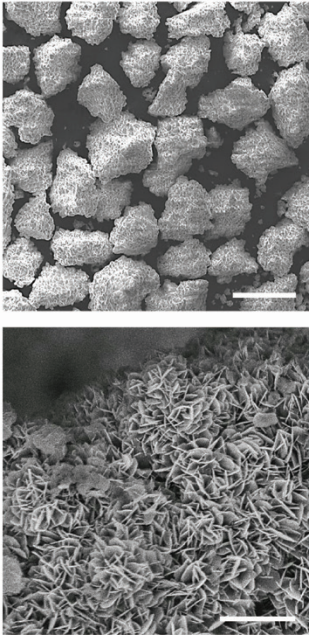
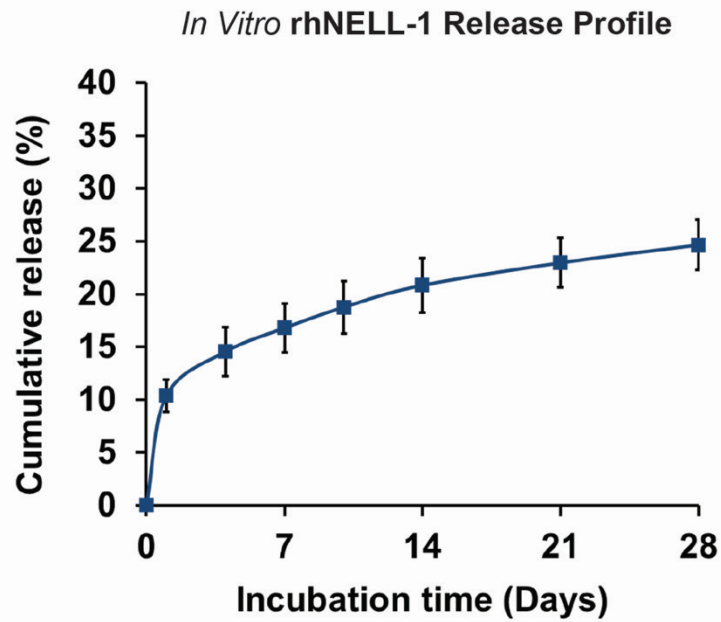


Supplemental Data

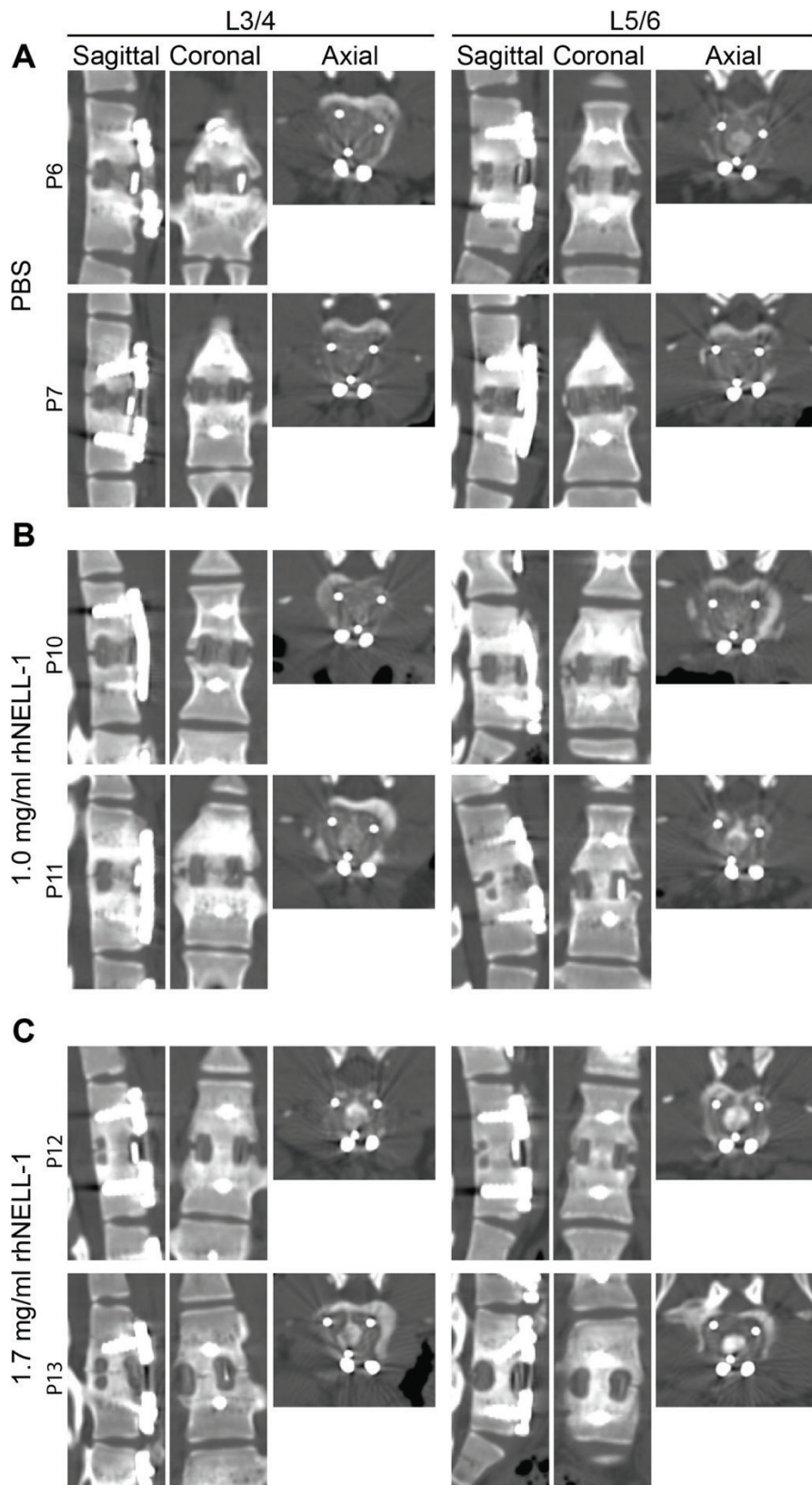
A aTCP Loaded rhNELL-1



B

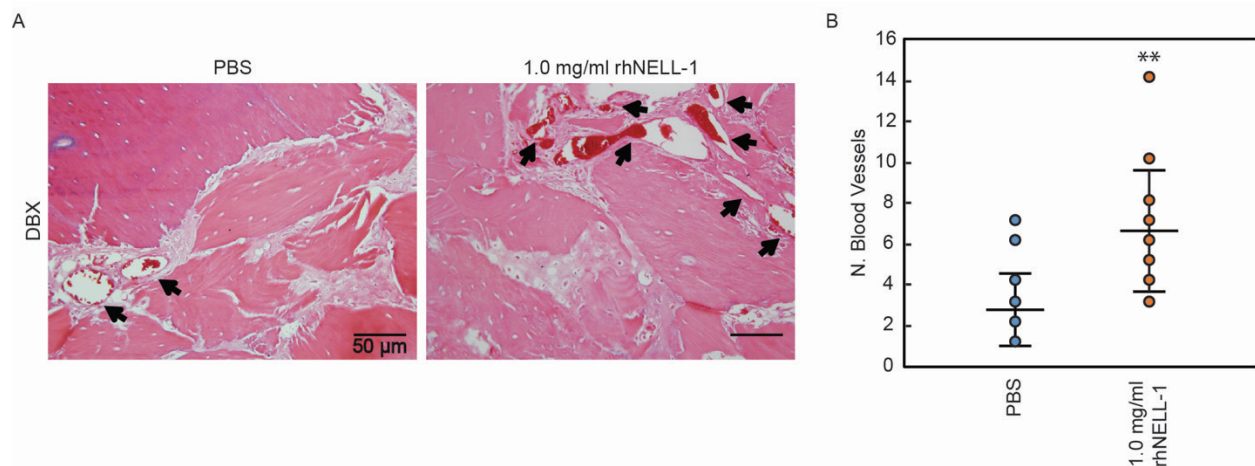


Supplemental Figure 1. NELL-1 release kinetics. (A) Scanning electron micrographs of the surface of apatite-coated tricalcium phosphate (aTCP) granules (50x; 1500x). The particles are 200–300 μm in diameter and porous, providing a large surface area favorable for protein adsorption. (B) In vitro release of recombinant human (rh)NELL-1 from aTCP particles in phosphate-buffered saline (PBS). Gradual release of rhNELL-1 over 28 days from the particles was observed ($n=3$ wells per timepoint, performed in single replicate, reported as mean \pm standard deviation).

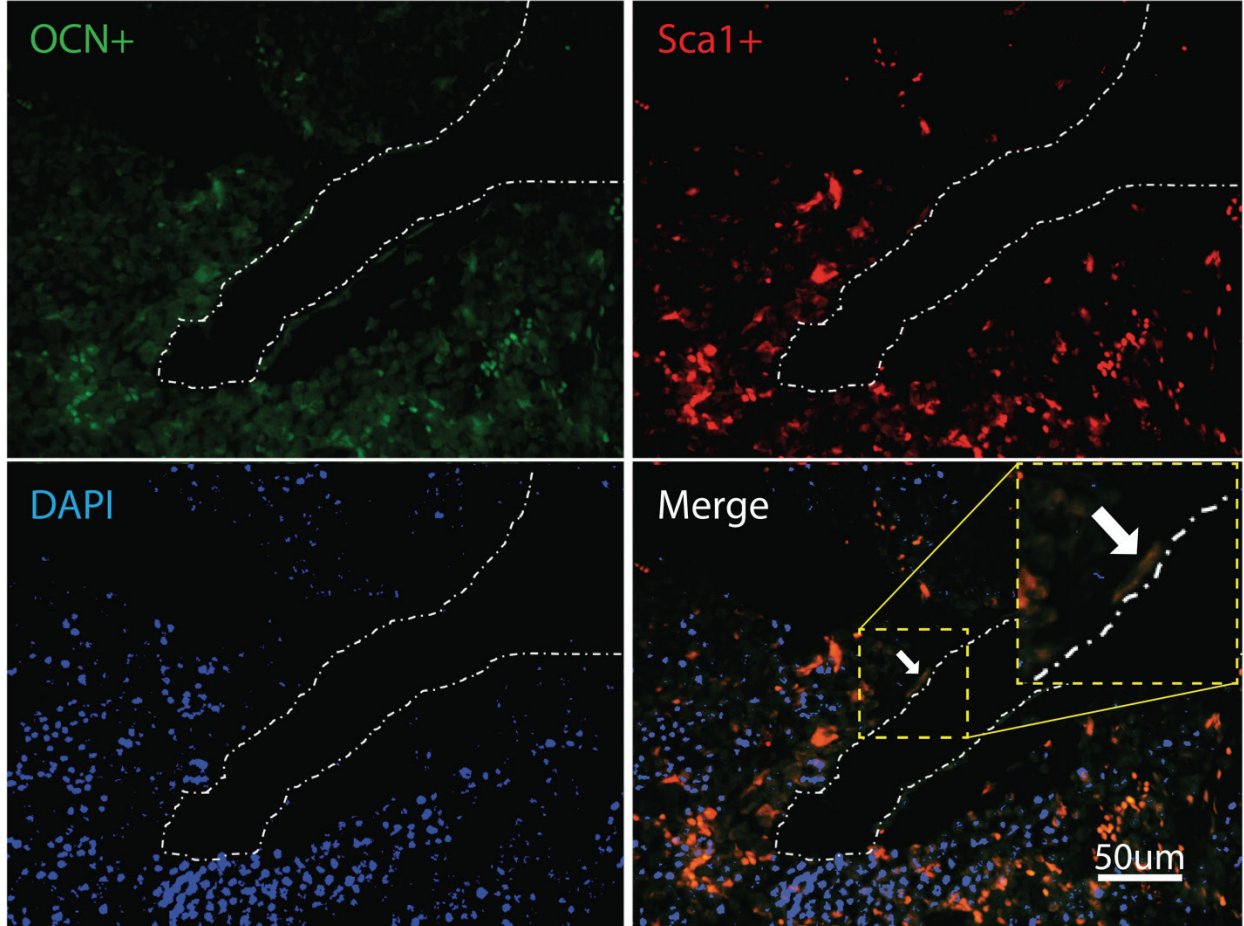


Supplemental Figure 2. RhNELL-1 application in non-human primate lumbar spinal fusion, live CT imaging.

Sagittal, coronal and axial CT (computed tomography) images from all samples at three months postoperative with either **(A)** PBS (phosphate buffered saline), **(B)** 1.0 mg/ml rhNELL-1 and **(C)** 1.7 mg/ml rhNELL-1 treatment. N=4 spinal fusion levels per treatment group, performed in single replicate.



Supplemental Figure 3. RhNELL-1 application in non-human primate lumbar spinal fusion, analysis of vascularization. (A) Blood vessel visualization (arrows), and (B) semi-quantification of blood vessel number within the lumbar spinal fusion segment from PBS (phosphate buffered saline) and 1.0 mg/ml rhNELL-1 treatment groups. A significant increase in blood vessel numbers was observed with rhNELL-1 (1.0 mg/ml). Robust ossification among the 1.7 mg/ml rhNELL-1 treatment group precluded a representative quantification of blood vessels at this dosage. N=4 spinal fusion levels per treatment group, performed in single replicate.



Supplemental Figure 4. Expression of Osteocalcin among Sca-1⁺ cells in the bone marrow compartment.

Imaged are mouse bone marrow after intravenous injection with rhNELL-1 (1.25 mg/kg). (**Upper left**)

Immunofluorescent staining for the bone marker Osteocalcin (Ocn), appearing green. (**Upper right**)

Immunofluorescent staining for the Sca-1 (Stem cell antigen 1), appearing red. (**Lower left**) DAPI nuclear

counterstain, appearing blue. (**Lower right**) Merged image with inset depicting Ocn and Sca-1 co-localization.