leakages in NC and VC groups but normal angiography in siSrc group. MicroCT revealed that the BMD and BV/TV of subchondral bone were significantly decreased in NC and VC while increased in siSrc group (7.7% of BMD and 9.3% of BV/TV) when compared to the baseline (-0.05). FEA showed higher stiffness (10.1%) and failure load (7.0%) of subchondral bone in siSrc group (p<0.05). Histologically, appositional bone formation around the osteonecrotic lesion was classified as reparative osteogenesis, whereas fibrosis linked to necrotic bone resorption was classified as destructive repair. There was increased osteoblast surface (32.5%) and decreased eroded surface (56.2%) in siSrc group when compared to NC/VC (p<0.05), while no significant difference was found in the osteoclast number, implying the function of Src siRNA in enhancement of osteoblasts and inhibition of osteoclast activities.

Conclusion: Multiple biomedical imaging evaluations demonstrated systemically that Src siRNA could be developed to prevent destructive repair in SAGN rabbits.

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ASSESSMENT OF CERVICAL LYMPHATIC DRAINAGE FUNCTION USING INDOCYANINE GREEN NEAR-INFRARED IMAGING IN RAT
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Objective: To assess the cervical lymphatic function of normal rats using an Indocyanine Green Near-Infrared (ICG-NIR) Imaging system.

Methods: ICG was injected into pharynx of the rats; the neck were illuminated with a 780-nm NIR laser to record the movement of ICG. There are five indicators to quantify lymphatic function (Figure 1): S-max; T-max; clearance of injection site and lymph nodes; T-max and the pulse of Lymph vessel (Figure 2).

Results: ICG and its transport within lymphatic vessels were readily visualized and quantified. ICG-NIR detected two lymphatic vessels and lymph nodes, and lymphatic pulses are in the vessels. After ICG was injected directly into a rat’s pharynx, the ICG signal accumulated at the site of injection and lymph nodes, peaked at 1 hour and decreased thereafter. At 24 hours, more than 90% of injected ICG disappeared from the injection site or lymph nodes. Lymph transfer within lymphatic vessels was carried out by muscle contraction, which could be detected by ICG-NIR as a form of lymphatic pulse. In this study, we detected lymphatic pulses within rat cervical lymphatic vessels, which was about 1.58±0.20/min.

Conclusion: Our findings provide very useful information regarding the evaluation of cervical lymphatic function in rats using ICG-NIR lymphatic imaging system, which is critical for establishing a protocol with the throat inflammation condition of lymphatic function change.

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Figure 1. Quantitative assessment of ICG-NIR images to evaluate lymphatic draining function in the rat pharynx.

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LOCALIZATION OF VERTEBRAE ON DXA VFA IMAGES USING CONSTRAINED LOCAL MODELS WITH RANDOM FOREST REGRESSION VOTING
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Objective: Osteoporotic fractures are associated with significant morbidity, mortality and public health costs, and will increase with an ageing population. Many osteoporotic vertebral fractures (VF) present on images do not come to clinical attention or lead to fracture prevention treatment. Furthermore, DXA vertebral fracture assessments (VFA) are often reported subjectively by a radiologist or other clinician. VFA computer-aided systems offer potential advantages.

Methods: Methods based on statistical shape models (e.g. active appearance models, AAMs) have been used to segment vertebrae in radiographs and DXA VFA. However, results achieved using AAMs exhibit significant numbers of large errors due to model fitting failure, particularly on more severely fractured vertebrae. We evaluate an alternative algorithm, the Random Forest Regression Voting Constrained Local Model (RFRV-CLMs), which has proved more robust and generalizable than AAMs in annotation of landmarks on DXA vertebras.

Figure 2. The ICG pulses that pass the ROI within 500 seconds.