Iodine-based agents such as Isovue and Omnipaque.

These contrast agents are used in humans primarily for visualizing vasculature and urinary tract, but may be useful for imaging other organs as well. They are small molecules, rapidly excreted through the kidneys, providing intense contrast in the kidneys and bladder. They can be dosed IP as a way to create contrast outside of organs such as the liver to aid in tumor identification. Both Isovue and Omnipaque come in a formulation ready for injection and are quite cheap (about a dollar per dose). They can be purchased via the punch out vendor McKesson Corporation. More information can be found online:

http://www.gehealthcare.com/caen/md/omnipaque.html
Example Image: Kidney contrast enhancement at 30min post-injection in Kras-p53 mouse with significant lung tumor burden. 2.5 minute fast scan conducted with GE eXplore CT 120.
**Fenestra LC/VC**

Fenestra Liver Contrast (LC) and Vascular Contrast (VC) agents are made of small lipid spheres containing an iodine-based compound. Being encapsulated in a lipid sphere results in slower clearance and longer window during which one can image the animal. The LC version targets the liver and provides contrast for up to several hours. The VC version is also cleared through the liver but more slowly than the LC version. Both are given by tail vein injection with the recommended dose being 500 microliters. (About $100 per dose depending on the desired contrast enhancement.)

More information can be found at the vendor’s site: [www.art.ca](http://www.art.ca)

Image acquired from a mouse, 120 minutes after dosing with 0.5mL Fenestra LC. Vasculature, liver and spleen are all clearly visible at this time point.
**eXIA 160**

eXIA is an “aqueous colloidal polydispersed” contrast agent that is similar to Fenestra. It is iodine-based, dosed IV and provides contrast of the vasculature for about an hour. eXIA 160XL is a “liver-specific” formulation that quickly clears the blood to provide contrast in the liver. Dosing and pricing are comparable to Fenestra. We have not yet tested this in-house.

More information is available here: [www.binitio.com](http://www.binitio.com)

Nanoparticle-based contrast agents

ExiTron12000 by MiltenyiBiotec is a barium-based nanoparticulate contrast agent. It provides good contrast and remains in the vasculature for several hours. A typical dose is 100 μL injected iv and costs about $92.

www.miltenyibiotec.com
**AuroVist** by Nanoprobes Inc. - gold nanoparticle-based contrast agent. High x-ray attenuation should yield better contrast than provided by iodine-based agents. It is slowly cleared from the blood resulting in contrast enhancement lasting about 10-15 hours, although the best contrast is obtained immediately after iv injection. Very little extravasation in healthy vasculature, but leaky vessels such as those found in tumors result in localized accumulation. In bulk the cost is about $140 per 40mg bottle, with one bottle being the recommended dose.

More info can be found here: [www.nanoprobes.com](http://www.nanoprobes.com)

Vasculature in large, hind limb tumor visualized with about half a dose of AuroVist.
Vascular Casting

**Microfil** corrosion cast vasculature imaging via perfusion of silicone rubber. The animal is perfused with silicone rubber that quickly hardens to form a cast of the vasculature. The rubber is radiopaque due to the inclusion of lead chromate. Optionally, the soft tissue and bones can be chemically removed from the cast. This may not be necessary for some applications.