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## PRODUCT INFORMATION AND INSTRUCTIONS

# VivoVist™

**VivoVist™**: super contrast, long blood half-life nanoparticle  
X-ray contrast agent for *in vivo*\* use

***Best Performance • Best Value • Best Price***

Product Name: **VivoVist™**  
Catalog Number: **1301-5X0.25ML (5 vials, each 0.25 mL, containing 75mg at 300 mg/mL)**  
**1301-25X0.25ML (25 vials, each 0.25 mL, containing 75mg at 300 mg/mL)**  
Appearance: **White opalescent solution**  
Quantity: **1 vial contains 75 mg alkaline earth metal in biocompatible nanoparticles**  
**Packaged as 300 mg/mL solution in phosphate buffered saline, pH 7.4**  
Revision: **1.0 (January 2023)**  
*\*not approved for human use.*

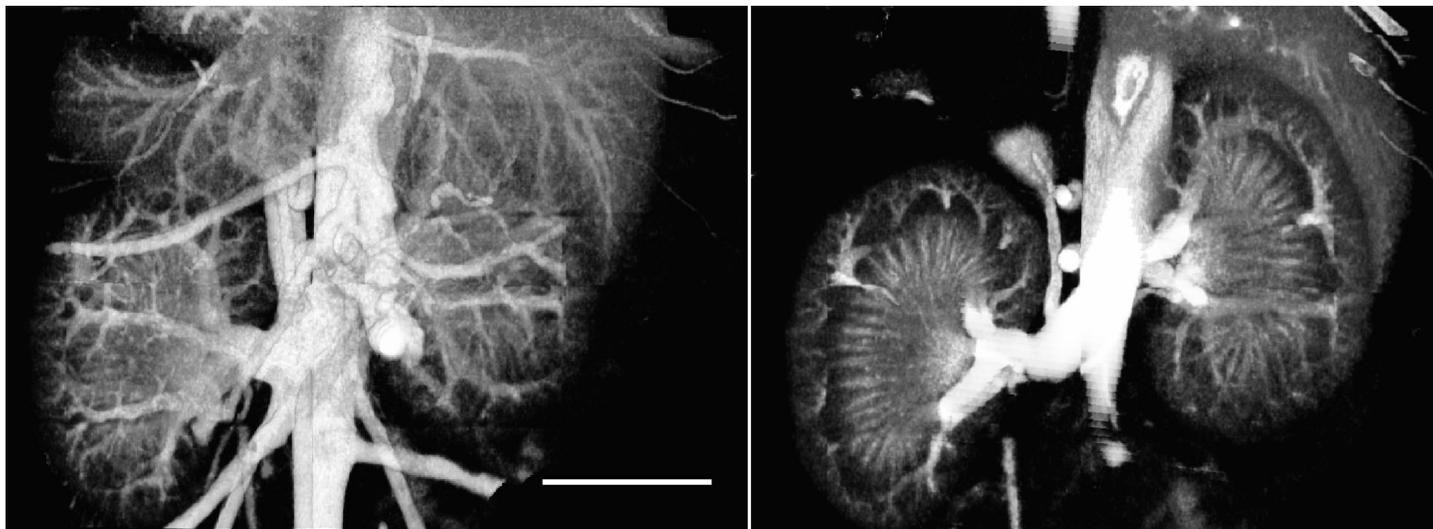
### Introduction

VivoVist™ is a novel nanotechnology contrast agent based on alkaline earth metal nanoparticles. VivoVist™ enables greatly enhanced X-ray imaging of blood vessels, tumors, and other tissues and organs.

Unique features and advantages of VivoVist™ include:

- Very high CT contrast, approximately 3-4 times that of alternatives. Initial blood concentration of 50 mg/mL (5%) gives >3500 HU.
- Long blood residence time: 14 hour blood half-life.
- Most affordable pricing
- Does not discolor skin.
- Low toxicity (4 g/kg is well-tolerated).
- Low osmolality, even at high concentrations.
- Easy to inject into small mouse tail vein blood vessels (typical injection volumes 0.08-0.25 mL).
- Can be imaged using MicroCT, clinical CT, planar X-ray, or mammography units.
- Enhances radiotherapy X-ray dose to tumors and other targets.
- Affordable rat imaging

The major difference will be in the results:



*Live mouse microCT imaging with VivoVist™. Image taken shortly after tail vein injection of 2g/kg VivoVist with a Scanco VivaCT 80. Bar=5mm.*

VivoVist™ is particularly useful for *in vivo* live animal microCT imaging, for studies of tumors, stroke, atherosclerosis and other vascular conditions, organ function, and other biological structural and functional analyses.

### Contents

Each vial of VivoVist™ contains 0.25 mL of 300 mg/mL alkaline earth metal nanoparticles. **NOTE:** this is the concentration of alkaline earth metal, which does not include other atoms in the nanoparticle. It is supplied in phosphate buffered saline (PBS: 20 mM sodium phosphate with 150 mM sodium chloride, pH 7.4).

### Physical Properties

The nanoparticle solution is opalescent white in color and may be diluted in water or PBS. For purification or exchange into other solvents, it may be pelleted at 5-10 kg and resuspended; sonication is recommended.

### Storage

This product is shipped at ambient temperature. Upon receipt, the VivoVist™ nanoparticle solution should be stored at 4°C. For extended periods of one month or longer, it should be stored at -20°C.

## INSTRUCTIONS FOR USE

**NOTE:** Because of the density of VivoVist™, the nanoparticles may settle over time. Mix well before using by flicking vial with finger, vortexing or shaking thoroughly. Sonication is not typically needed, but may be used.

For use at >1g/kg, a slow injection time (e.g., 10 sec) is recommended, and at 4g/kg this is required.

VivoVist™ is supplied ready to inject. A typical volume for intravenous injection into a mouse (for example into the tail vein), is 0.08 - 0.25 mL of the 300 mg/mL solution. For calibrated imaging, the amount should be

scaled by animal weight. For example, for 1g/kg (body weight) in a 25 g mouse, 25 mg should be used. At 300 mg/mL, this is 0.083 mL. For 3g/kg in a 25 g mouse, 75 mg should be used. At 300 mg/mL, this is 0.25 mL.

VivoVist™ may be diluted with PBS as needed. Typically, 1 g/kg gives very good imaging contrast. 3g/kg gives super contrast. Since the maximum tolerated dose (MTD) is >4 g/kg, larger or multiple injections are feasible.

Rat imaging: Good rat vascular imaging can be obtained at 0.54g/kg. This equates to injecting 1.8 vials of VivoVist™ (134 mg) in a 250g rat.

### **X-ray Instruments**

**Mammography:** These instruments are suitable for small animal imaging. Use of lower kVp (e.g., 22 kVp) is recommended to take advantage of the L edge alkaline earth metal absorptions. Exposures are typically 1 sec or less for a mouse, so live imaging is possible. Resolution can be < 0.1 mm.

**Clinical CT:** 80-100 kVp (lower kVp setting) gives the greatest contrast. Imaging time is typically a few seconds, with resolution ~0.3 mm.

**MicroCT:** Here the resolution is increased (to even 2 microns), but the tube power is typically ~100 times less than a clinical unit. Fine area detectors mean that many tiny pixels must each receive enough counts. This then requires a much longer imaging time (e.g., with many microCT scanners 20 minutes - 2 hours) than with a clinical CT (a few seconds). Many units also slow the tube rotation down such that only 1 revolution is done in the selected imaging time (e.g. 1 hour). If the animal moves during collection of this data set, the back projection 3D reconstruction will be errant and resolution degraded. This places significant constraints for live animal imaging, and motion must be minimized, such as by immobilizing the leg or other organ or limb of interest, if highest resolution is desired. Some units offer gated imaging, and some have a fast acquisition time (~1 min) with reduced resolution.

**Cabinet X-ray units:** Various cabinet (refrigerator-like) X-ray units provide imaging of animals, including those from Precision X-ray (<https://precisionxray.com/>) and Xstrahl (<https://xstrahl.com/>).

### **Technical Assistance Available.**

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