Phantech

Bio-Mouse™ Phantoms

Technical Specifications



INNOVATIVE HARDWARE AND SOFTWARE FOR MEDICAL IMAGING

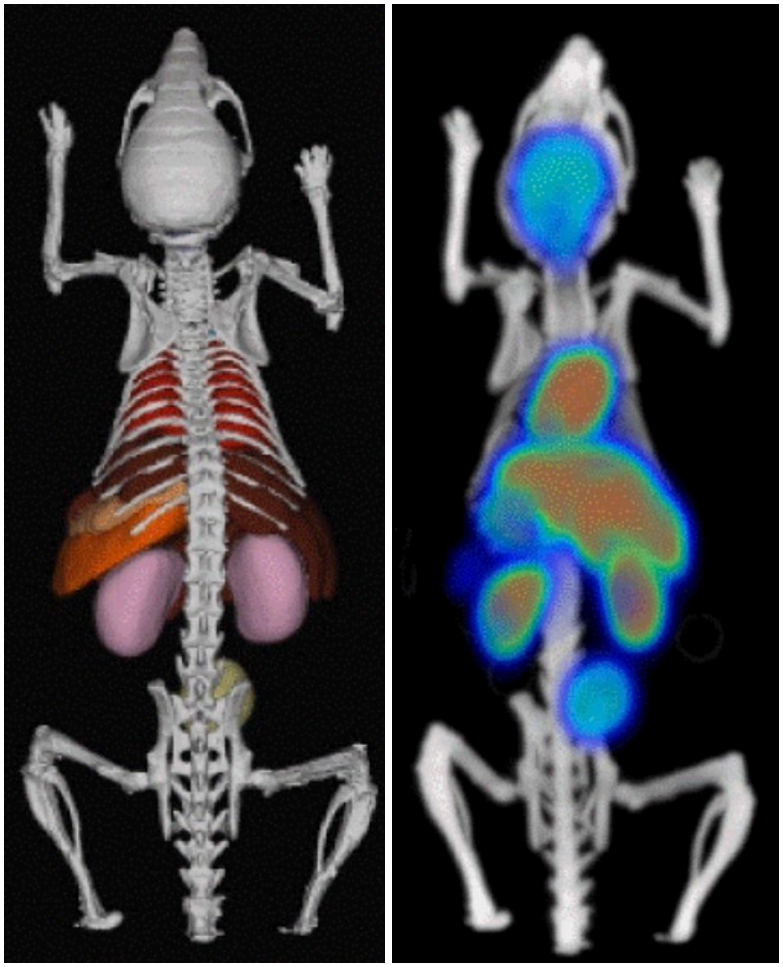
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Product: Bio-Mouse™ Phantoms

Overview

Phantech has developed the Bio-Mouse™; the first fillable biomimetic mouse phantoms with Computed Tomography (CT) Hounsfield Unit (HU) density-equivalent bone and soft tissue. These phantoms are highly versatile and can be customized to include/exclude the following organ/tissue voids: tumor(s), brain, heart, lung, liver, spleen, stomach, kidneys, bladder, and a background region. Phantech offers standard 20g, 25g, 30g and 35g mice, but custom sizes can be accommodated upon request. Voids are fillable with imaging agents for PET, SPECT, CT, X-ray, optical, MRI and MPI modalities. These phantoms are commonly used for theranostics, dosimetry, biodistribution modeling, reconstruction optimization and testing, system performance (especially for 3-4 mouse bed configurations), training, and multi-modality applications.



Bio-Mouse™ Key Features:

- Modeled after *in vivo* mouse CT dataset
- Standard 20g, 25g, 30g, 35g mouse
  - Custom sizing available
- Proprietary materials that are Computed Tomography (CT) density matched
  - Bone and soft tissue
- Compatible for most imaging modalities, including MRI
- Automatic segmentation and analysis with Imalytics (Gremse-IT) Preclinical Software
- Standard fillable organs/tissues: Brain, heart, lung, liver, spleen, stomach, kidneys, bladder, background region
  - Tumor voids can be added as a custom build
- All fillable voids use an O-ring and screw to seal and prevent leaking

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Organ Void and Volume List

(Custom combinations available upon request)

Organ	***20g Mouse*** *Volume (uL)*	***25g Mouse*** *Volume (uL)*	***30g Mouse*** *Volume (uL)*	***35g Mouse*** *Volume (uL)*
Background	2521	3151	3782	4357
Bladder	197	246	262	341
Brain	405	506	538	700
Heart	155	193	206	268
Kidneys (L/R)	244 (121/122)	305 (151/152)	324 (160/162)	420 (209/211)
Liver	1003	1253	1333	1733
Lungs (L/R Lobe)	142 (46/95)	177 (57/118)	188 (61/126)	245
Spleen	62	77	82	107
Stomach	115	143	152	199
Flank Tumor*	300	300	300	300



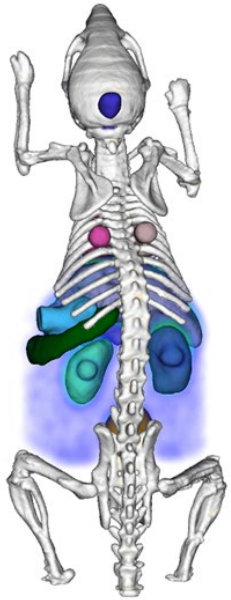
**Other/additional tumors can be added (e.g. 200, 300, 400, 500, 600, or 700 uL spherical lesion).Phantech can also work with provided image data to add volumes of interest.

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Automatic segmentation and analysis with Imalytics (Gremse-IT) Preclinical Software

Automated Analysis Workflow

1. Fill BioMouse™ with desired radioactivity concentration
2. Perform PET or SPECT scan
3. Load image file into Imalytics (compatible with most systems)
4. Enter total “administered” activity
5. Select BioMouse™ from the phantom dropdown
6. Generate and save report from “Class Statistics”



Class Statistics (Overlay) Channel index: 1 Channel name: SPECT

Table

	Time Index	Time [s]	Voxels	Volume [mm^3]	Mean [%ID/ml]	Sum [%ID/ml]	Total [m%ID]	Stddev [%ID/ml]	Min [%ID/ml]	Max [%ID/ml]
Gut	0	0	457,172	1,872.58	8.84462	6.31799E+07	16,562.2	2.40833	0.618967	20.0922
Heart	0	0	26,492	108.511	25.2781	1.04635E+07	2,742.95	6.13792	3.61115	46.3751
Brain	0	0	69,660	285.327	2.75575	2.99946E+06	786.291	0.710055	0.665117	5.50736
Right Lung	0	0	14,200	58.1632	1.76885	392,463	102.882	2.31791	9.64775E-06	15.8816
Left Lung	0	0	6,626	27.1401	1.72314	178,399	46.7662	1.82515	0.00102416	12.0478
Liver	0	0	162,513	665.653	45.2278	1.14845E+08	30,106	10.605	7.41863	87.8234
Bladder	0	0	39,562	162.046	33.4784	2.06949E+07	5,425.04	7.49627	5.84406	51.2507
Spleen	0	0	8,907	36.4831	10.1259	1.40924E+06	369.423	2.41066	1.7095	21.6269
Right Kidney	0	0	19,790	81.0598	47.1095	1.45671E+07	3,818.69	9.32991	20.2578	72.6639
Left Kidney	0	0	22,262	91.1851	42.806	1.48898E+07	3,903.27	8.07438	19.3828	63.7805
Stomach	0	0	19,104	78.25	11.017	3.28857E+06	862.08	2.94664	2.64888	22.4298
Rings	0	0	23,440	96.0102	1.19549	437,847	114.779	1.52139	9.39849E-08	7.68056

Save as... Close

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Product: Bio-Mouse™ Phantom

Filling Instructions

Filling Instructions

- Inspect all O-rings and screws before use
- Filling is recommended using a correctly sized syringe (see table on page 2 of this packet) and a flexible oral gavage needle
- Add food coloring for better visualization of successful filling
- For filling with radiometals, creating slightly acidic pH will prevent sticking to the phantom
- To lower water surface tension and prevent bubbles, a small amount (<1% v/v) of a surfactant can be used

Filling steps:

1. Remove the screw(s) and O-ring(s) to the void.
2. Insert the oral gavage needle to the deepest point in the void.
3. Slowly push the plunger to fill the void, and back out the needle as the void is filling, keeping the needle bevel below the solution level. Fill the void to the bottom of the screw hole to prevent overfilling when the screw is inserted.
4. Replace the screw(s) and O-ring(s). Turn the screw 1/8 turn after initial resistance is felt. Do not overtighten the screws. The O-ring should be slightly compressed, but should not lose normal shape.
5. Proceed to the next void.
6. Wrap phantom in Parafilm and then scan

- Emptying: Insert the syringe with the oral gavage needle and gently draw the solution out of each void. With the screws and O-rings removed, quick shaking can be applied to remove the solution.
- Cleaning: flush the phantom with saline followed by several passes of air. Leave caps off and allow phantom to completely dry. **WARNING: Do NOT use organic solvents such as acetone, EtOH, isopropyl alcohol, denatured alcohol or other harsh chemicals to fill or clean Phantech phantoms; these chemicals may compromise their integrity.** Use saline for filling and cleaning. Neutral pH of filling solution is recommended but slightly acidic solutions are tolerated for short-time use with radiometals, for example. Empty the phantoms as soon as possible after use and then store them in a protective case in a dry location. Do NOT autoclave. If applicable, inspect O-rings before each use. Replace O-rings if they appear dried or cracked.

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