

## STRIATAL PHANTOMS FOR SPECT/PET

### THE HEAD

The Head Phantom is based upon a standard RSD head with a calvarial cut to insert or remove the brain shell easily. The nasal cavity and maxillary sinuses are filled with foam with a mass density of 0.23 g/cc.

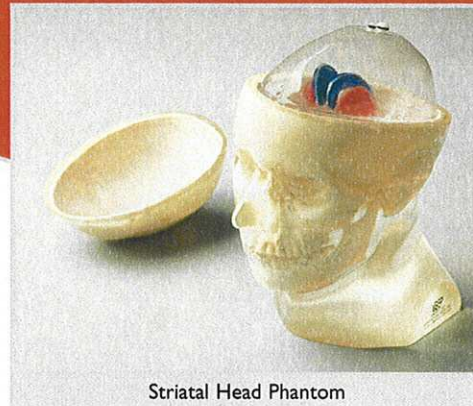
### BRAIN SHELL

The brain shell has five compartments which can be filled separately: left and right nucleus caudate, left and right putamen, and the remainder of the brain. This allows different nucleus caudate to putamen ratios as well as different striatal to background ratios to be obtained; this also permits differences between left and right striatal activity to be examined.

The volume of the brain shell is about 1,260 ml. The volumes of the nucleus caudate and putamen are 5.4 ml and 6.0 ml respectively.

### FILLABLE EXTERNAL MARKERS

A set of fillable capsules is provided to serve as external markers. Capsules can be filled with a radioactive solution and attached to the external surface of the phantom. The phantom can then be imaged, using SPECT or PET modalities to compare image-registration techniques.



Striatal Head Phantom

### MODEL NUMBERS

| Catalog Nos. | Description  |
|--------------|--|
| RS-900T      | Head with transparent Brain Shell containing Striatum. (Includes a set of fillable markers.) |
| RS-901T      | Transparent Brain Shell containing Striatum.   |

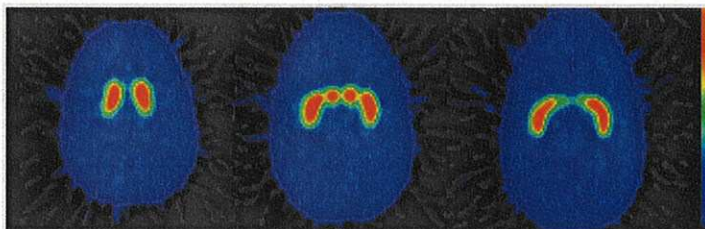
Quantification of striatal uptake is not straightforward because it depends on a number of factors:

Type of radionuclide used (Tc-99m, I-123 or F-18)

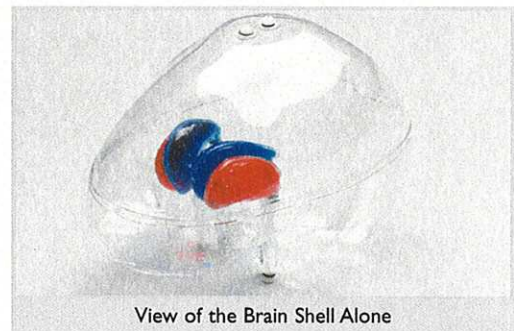
Imaging factors such as: collimator type, amount of scatter and attenuation.

Image processing parameters such as: scatter and attenuation-correction techniques, type of reconstruction filter, slice thickness, region-of-interest size and its location.

In normal subjects, the putamen and head of the nucleus caudate are small structures with typical dimensions of 7-15 mm in the axial plane (that is comparable to the system resolution). Since partial volume effects are more important for objects with dimensions less than twice the system resolution, the selection of imaging and reconstruction parameters is critically important in calculating the striatal-to-occipital ratio used to measure the relative striatal uptake in the brain.



PET Images of the Striatal Phantom filled with 0.8 mCi of FDG were acquired on a Siemens/CTI ECAT EXACT HR PET system in 2-D mode at the University of California at Los Angeles (UCLA) by courtesy of David Stout. The emission scan contained 43 million counts and was corrected for attenuation and reconstructed with a Hann filter resulting in a final image resolution of approximately 7.6 mm FWHM.



View of the Brain Shell Alone

