

Galileo™

Advanced Medical Image Analysis Software: Galileo|BrainGuide™

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Galileo|BrainGuide: Principles of Design

"Declare the past, diagnose the present, foretell the future; practice these acts. As to diseases, make a habit of two things - to help, or at least to do no harm."

Hippocrates (ca. 460 - 377 B.C.) - *Epidemics*, Book I, Section XI.

1. **Fast.**

- All BG analyses are completed in 30 seconds or less.
- Both practical and useful in a clinical environment

2. **Automatic.** All BG image analyses require only "one-mouse-click".

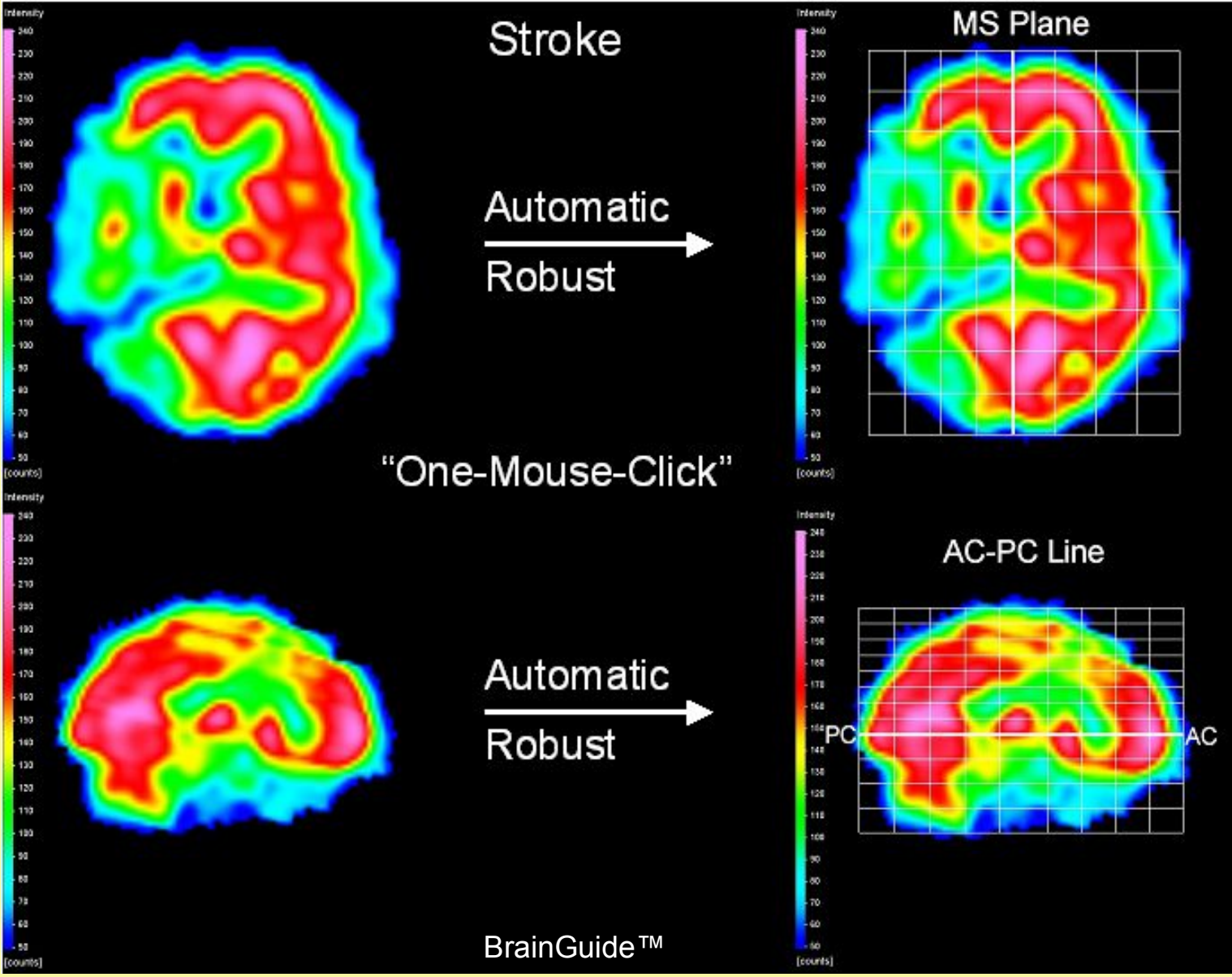
3. **Robust.** BG has successfully processed all clinical images regardless of the severity of any disease-induced defects. Including

- Alzheimer's Disease
- Other Dementia,
- Stenosis,
- Stroke, and
- Hematoma.

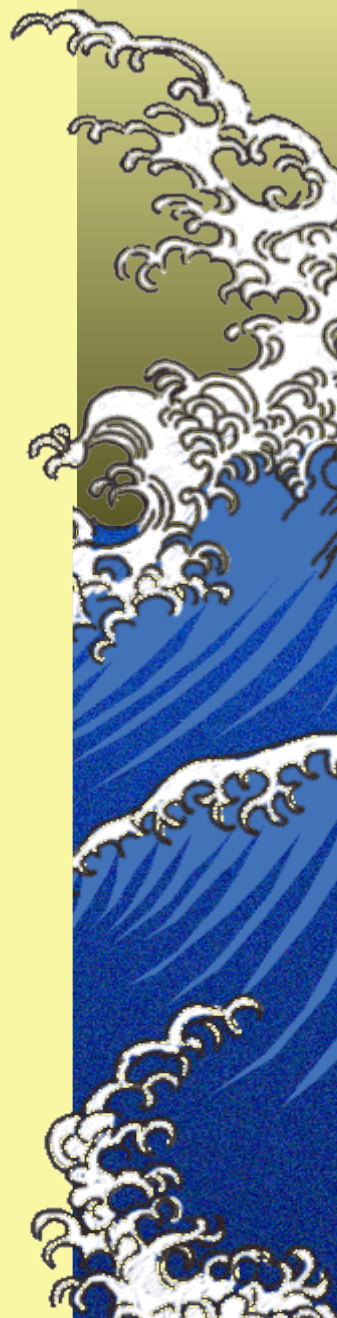
4. **Friendly.** BrainGuide is simple, easy, and intuitive to use. BG runs on a PC with the Windows 2000 / XP operating system.



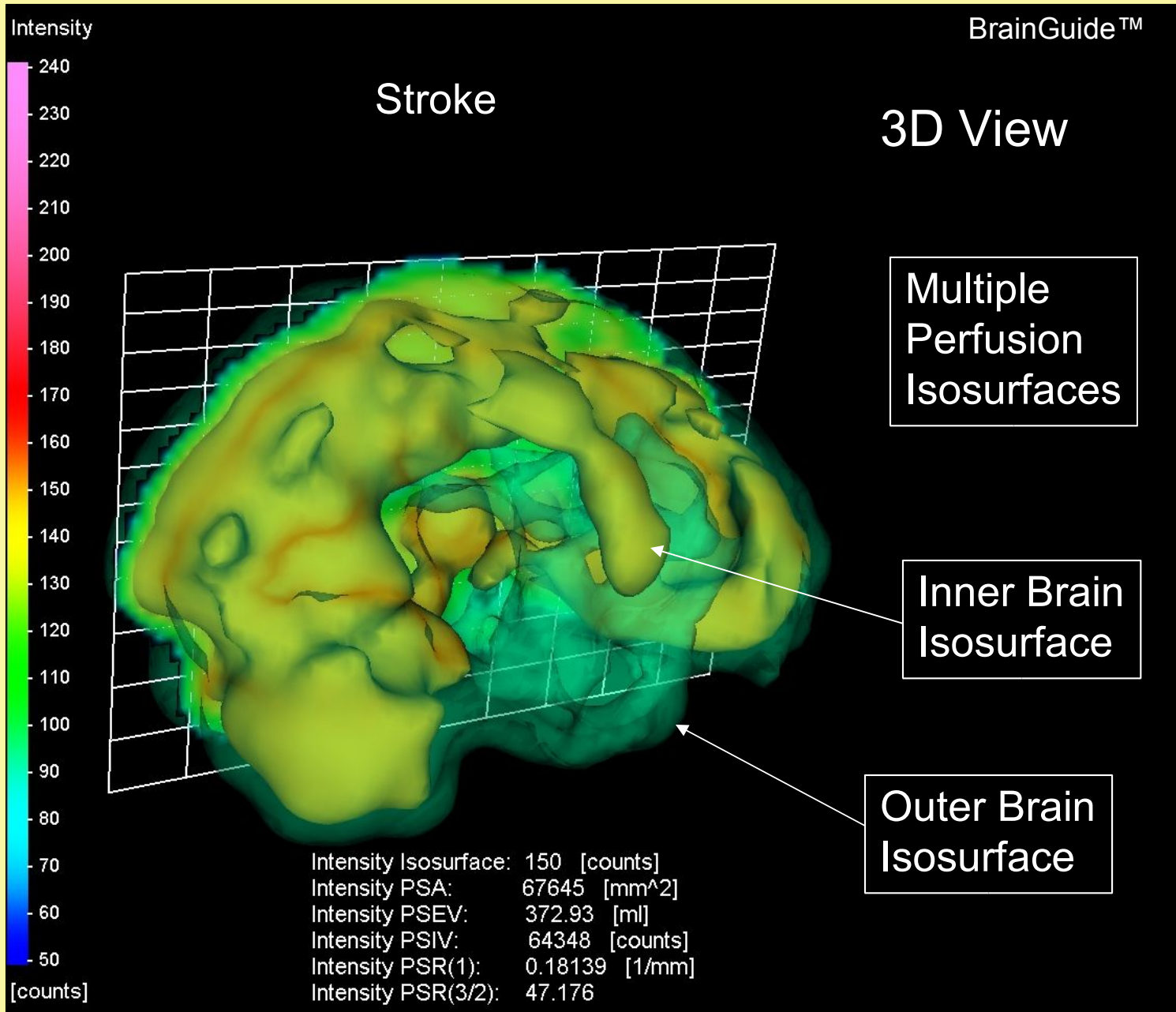
BG: 6 DOF Orientation to Talairach Standard



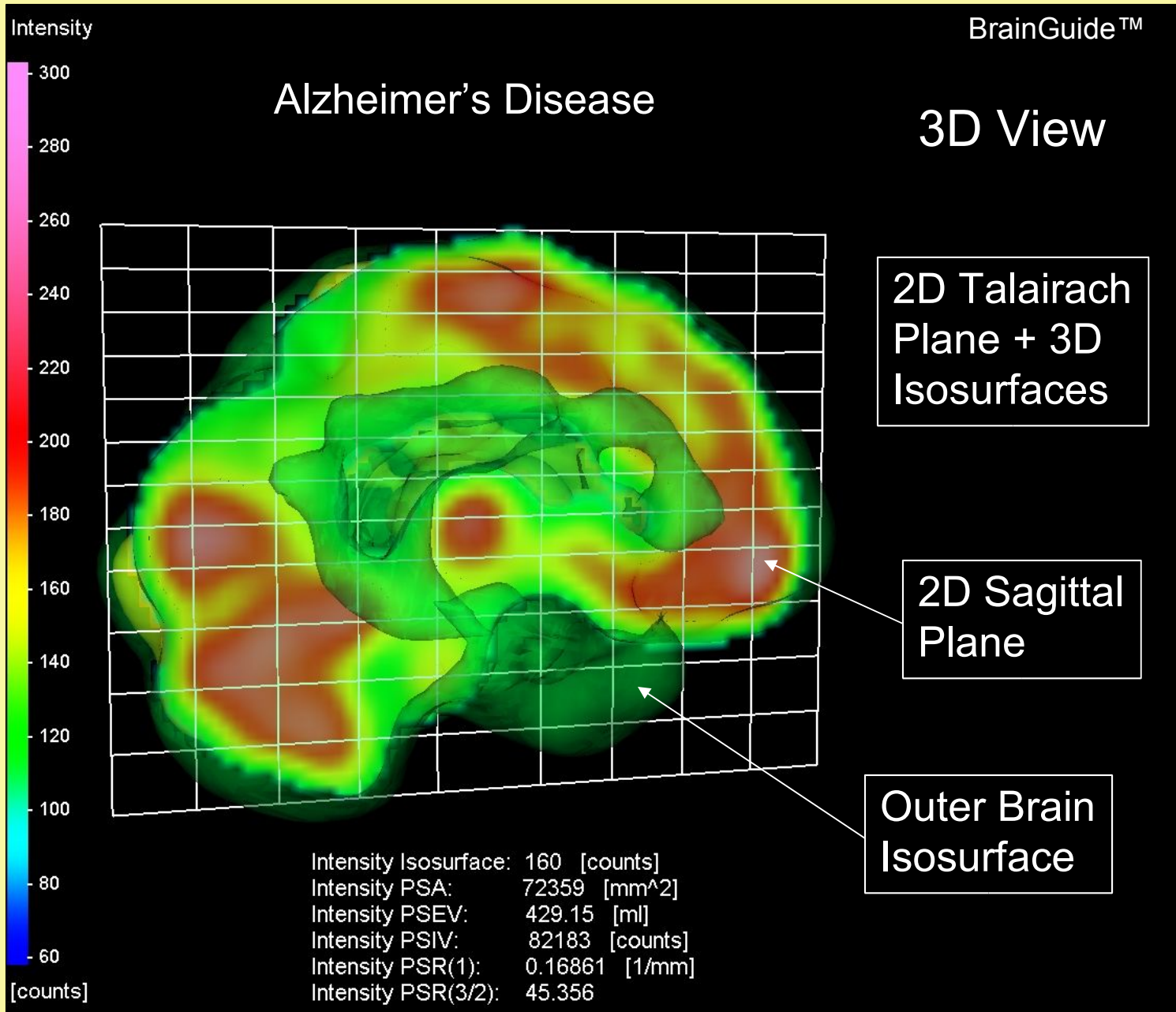
“One-Mouse-Click”



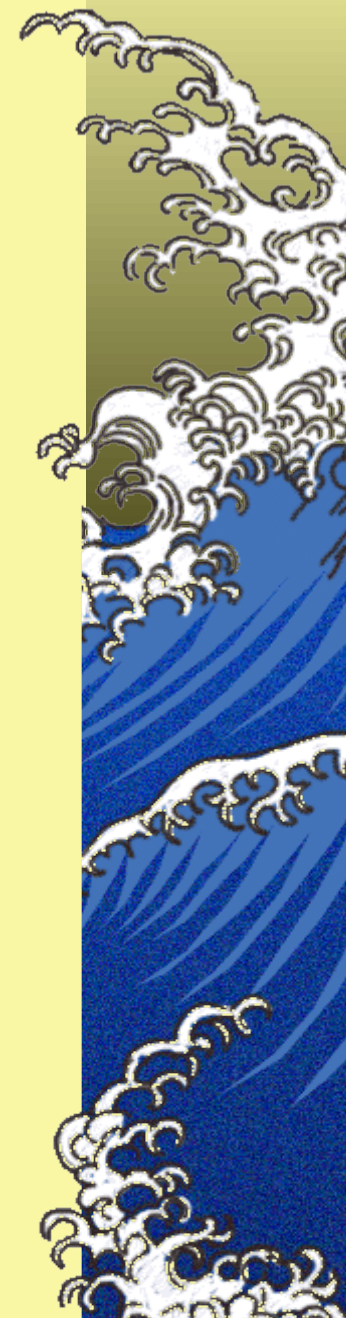
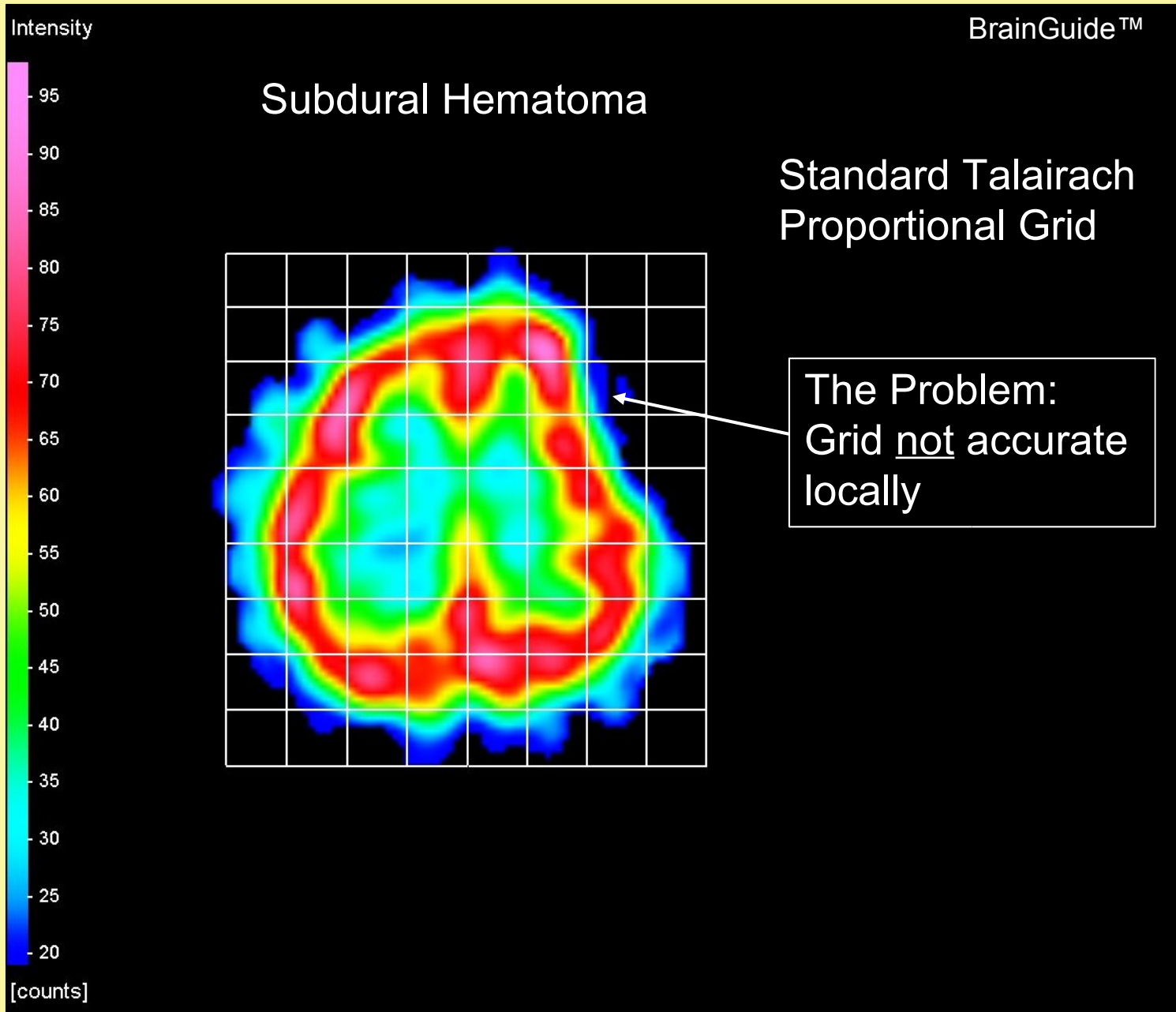
BG: Talairach Standard Grid 3D View



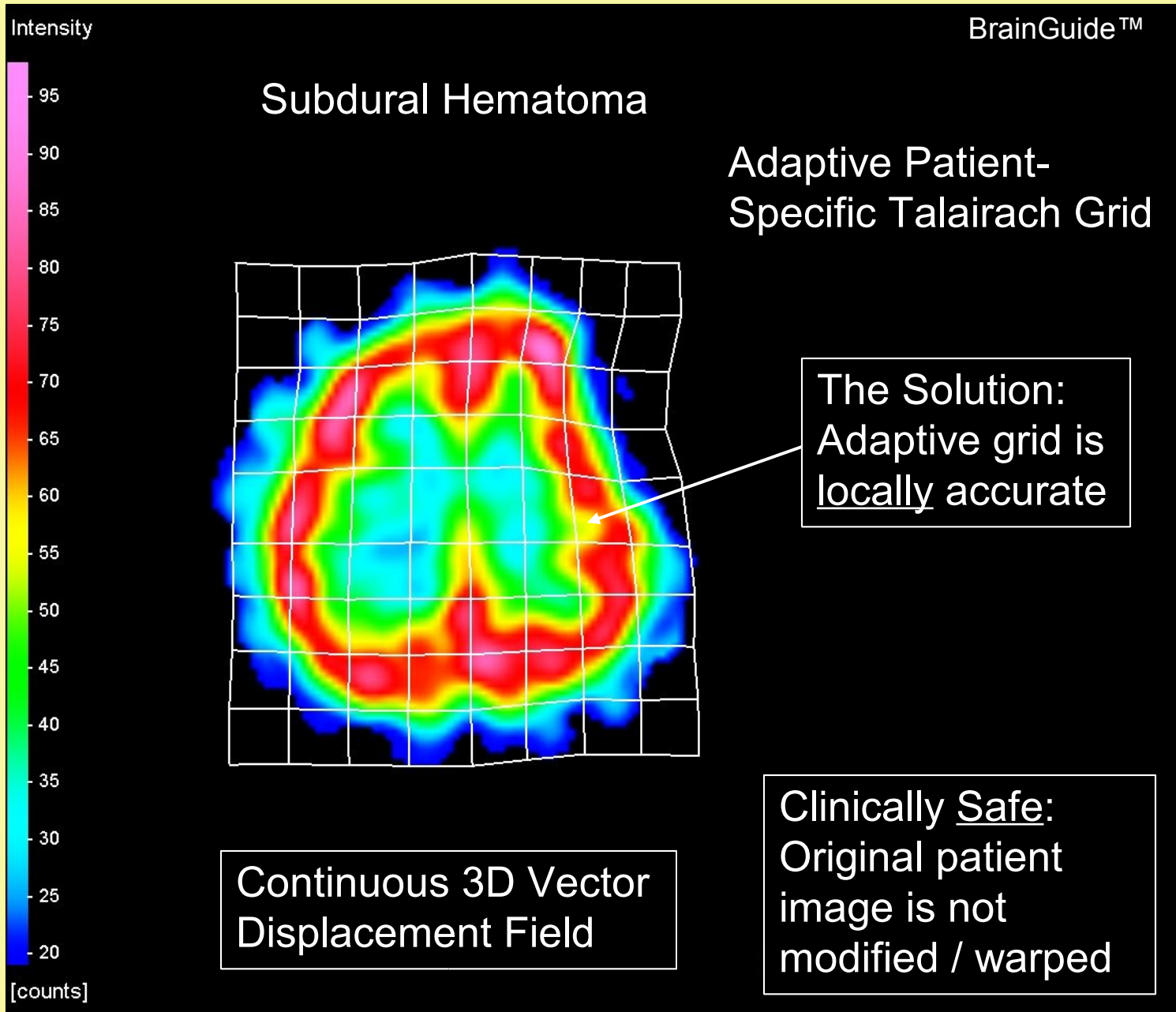
BG: Talairach Standard Grid 3D + 2D View



BG: Patient-Specific Adaptive Talairach Grid

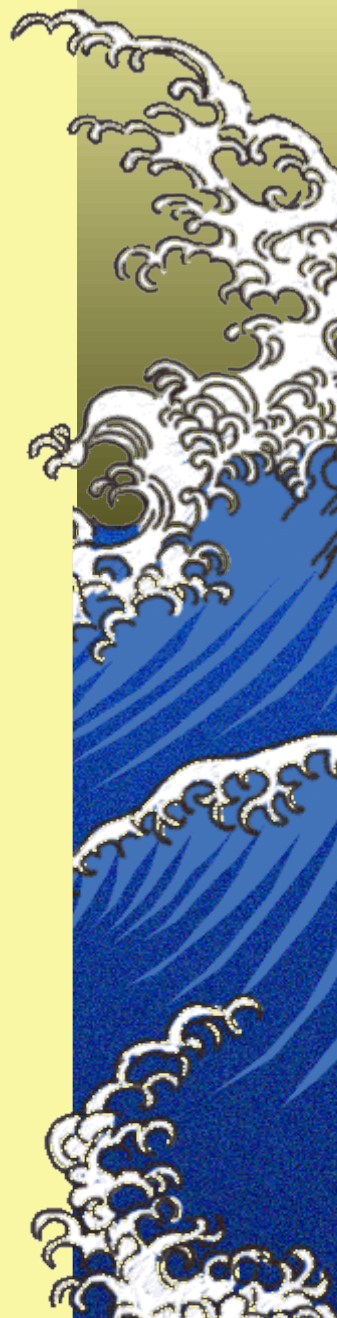
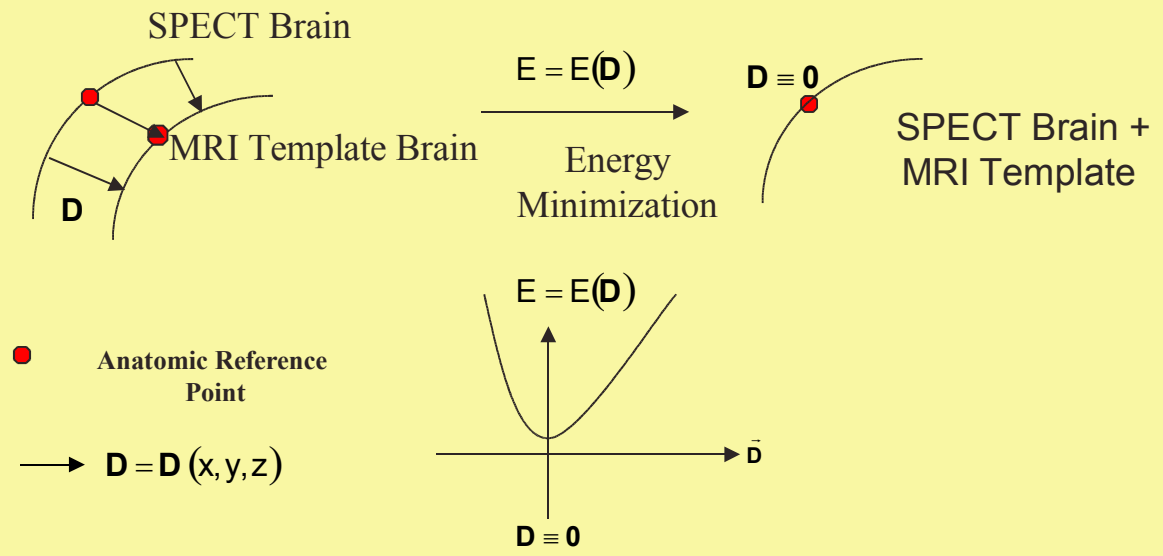


BG: Adaptive Patient-Specific Talairach Grid

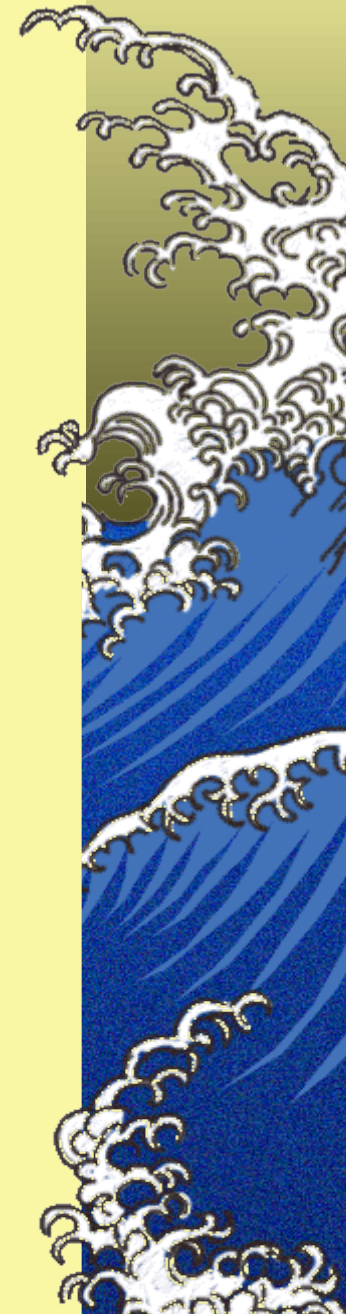
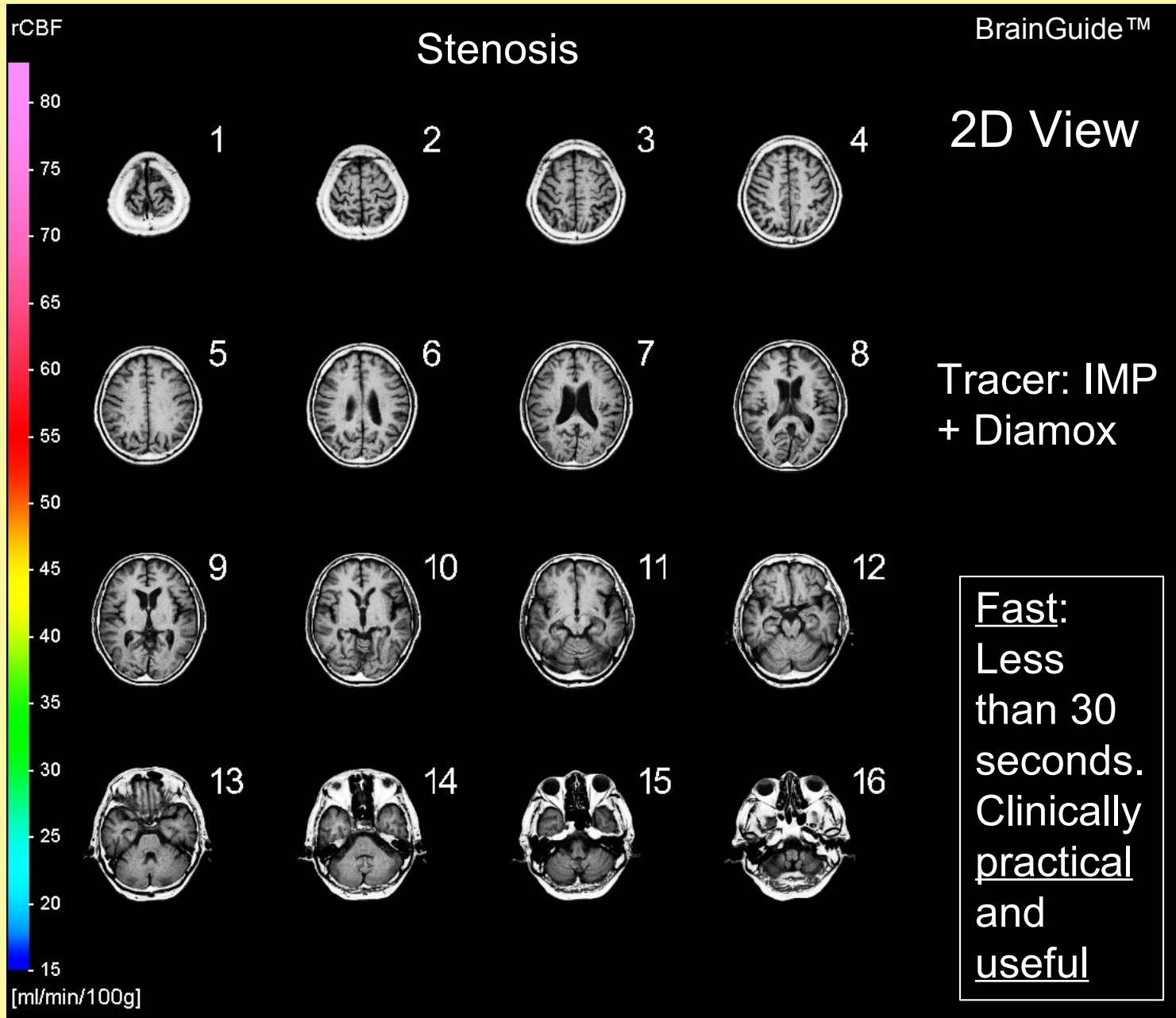


BG: Adaptive Patient-Specific Talairach Grid

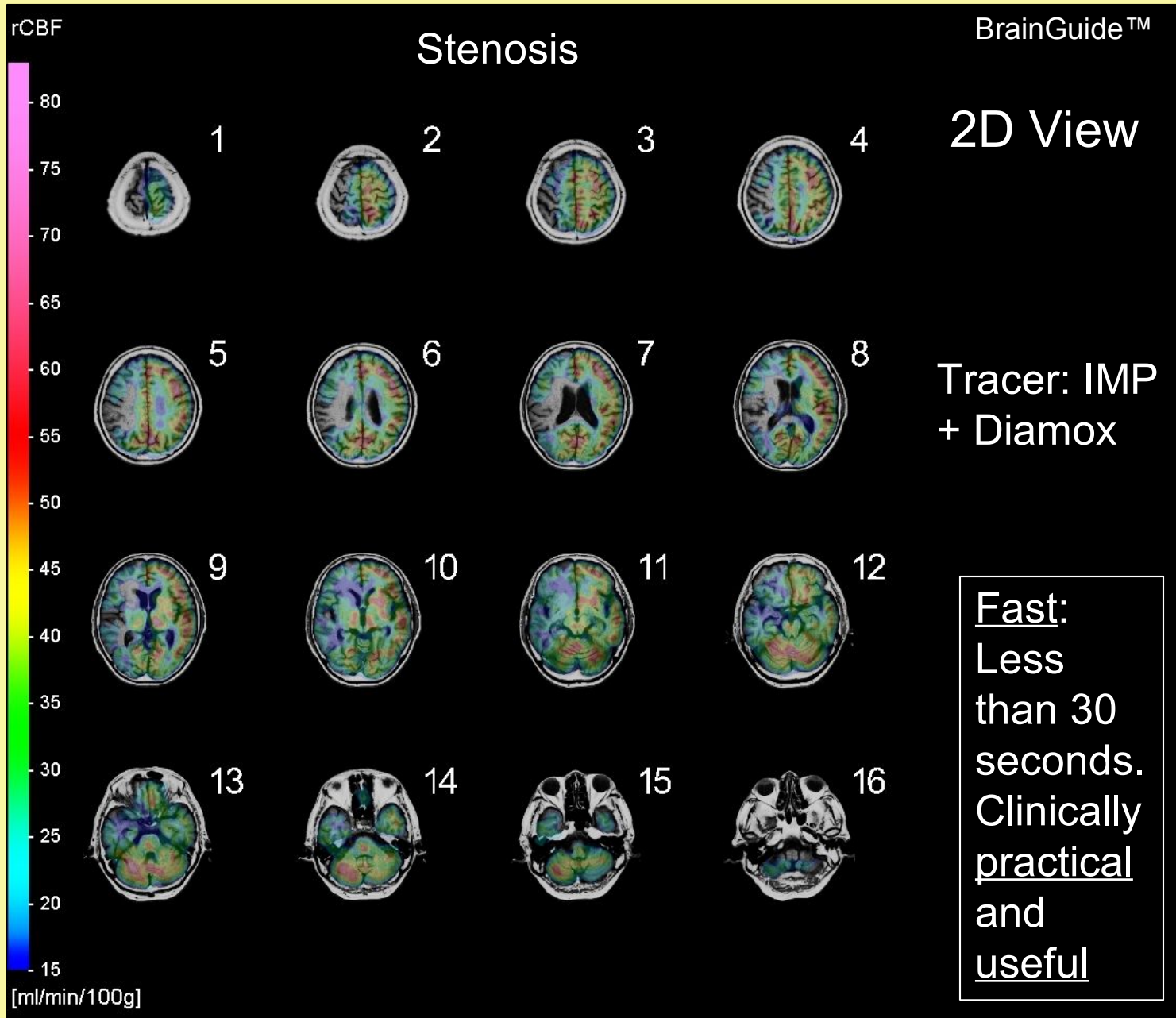
Use **anatomic reference point** constrained “**energy minimization**” to calculate a **continuous** SPECT to MRI Template 3D displacement field: $\mathbf{D} = \mathbf{D}(x, y, z)$



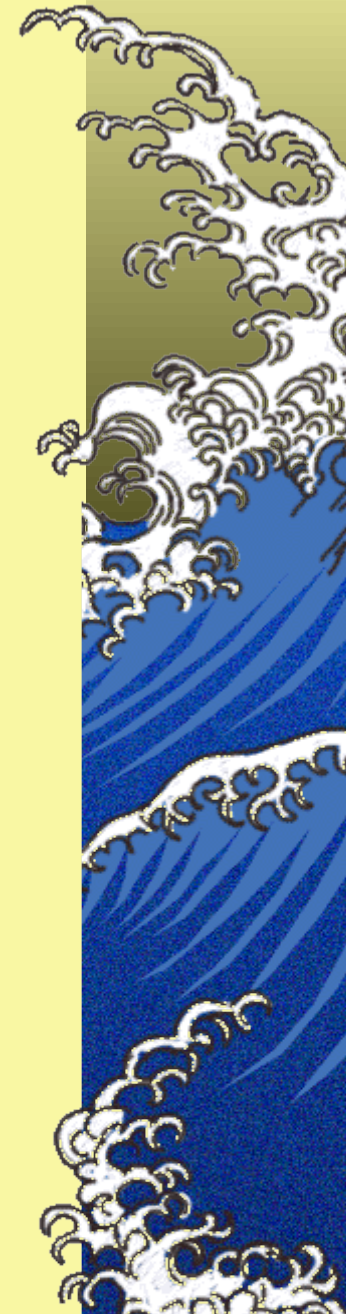
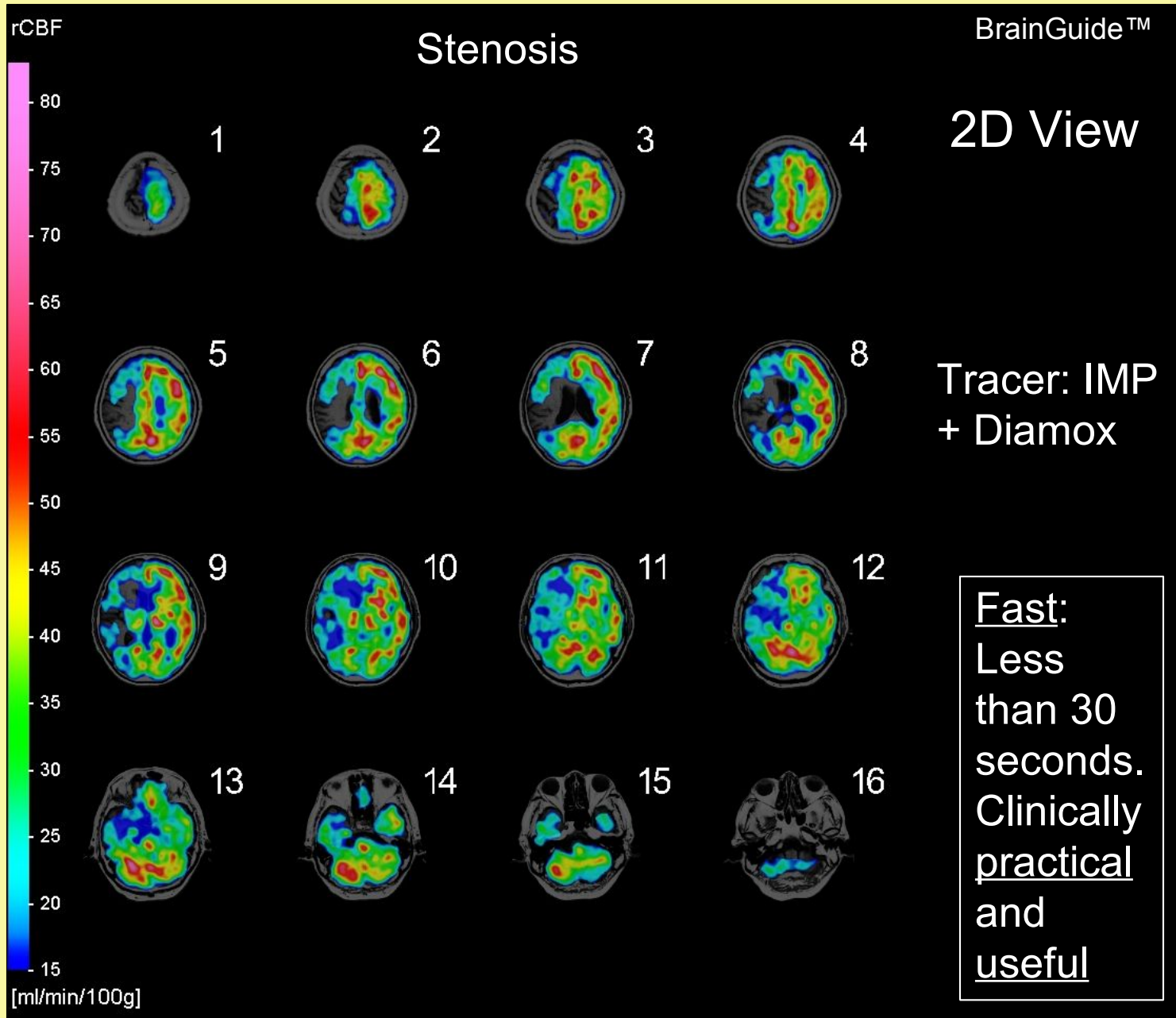
BG: 2D MRI + SPECT Image Fusion



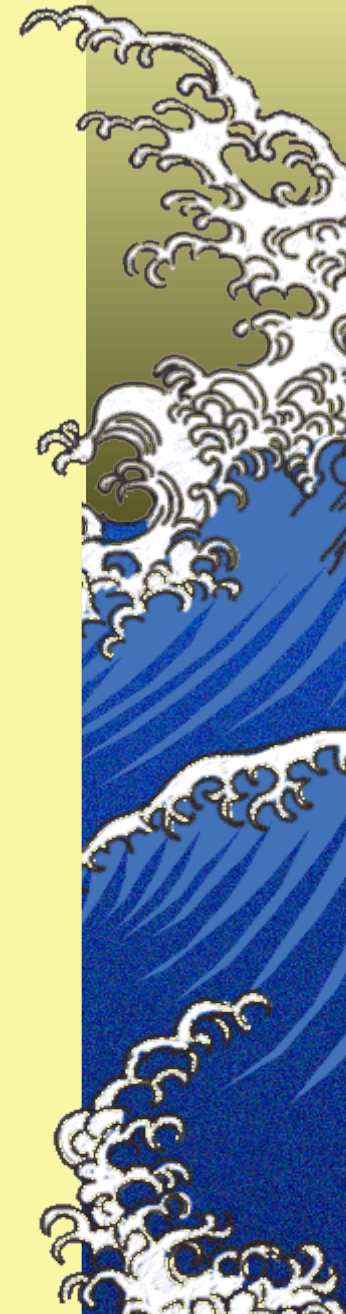
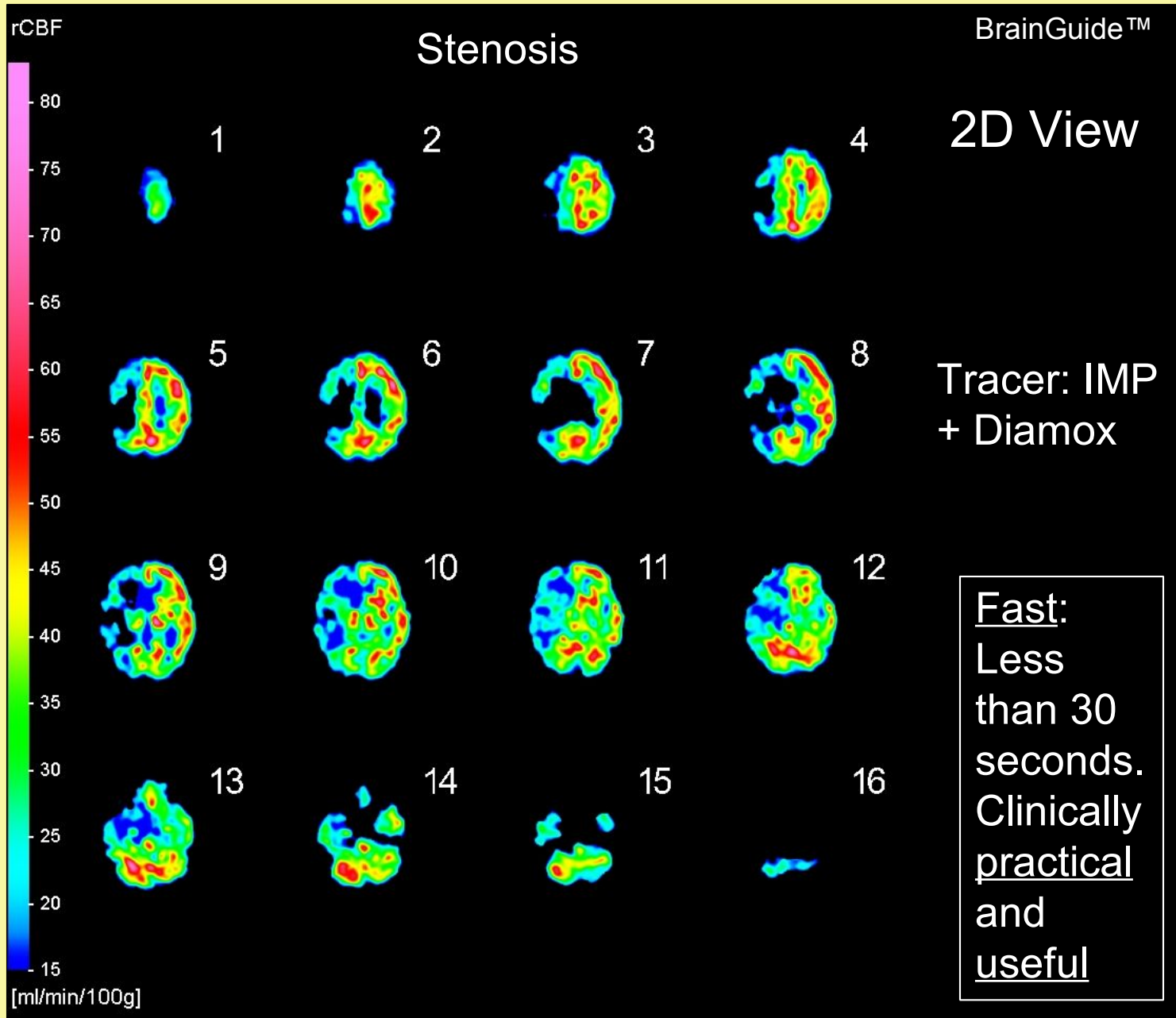
BG: 2D MRI + SPECT Image Fusion



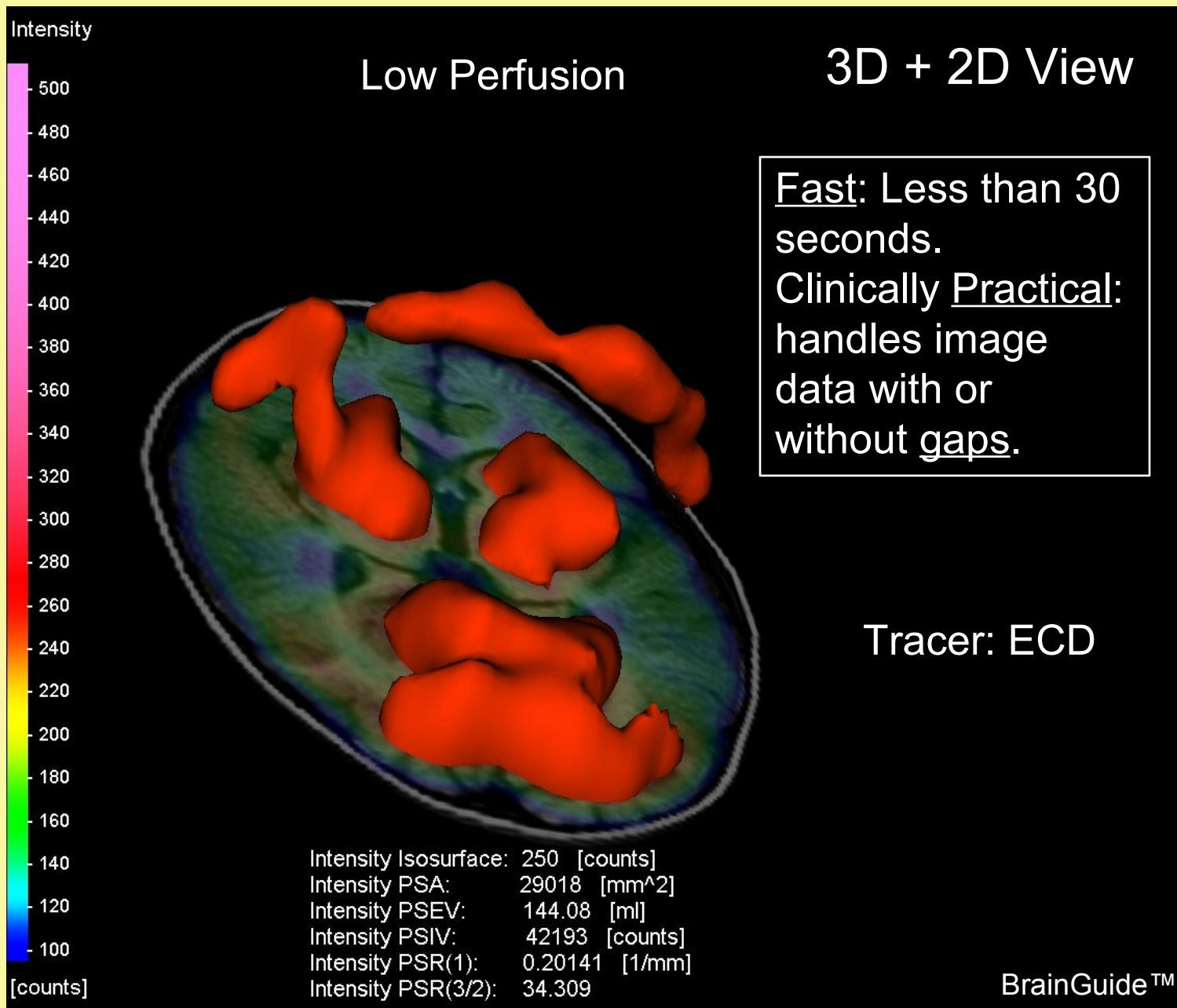
BG: 2D MRI + SPECT Image Fusion



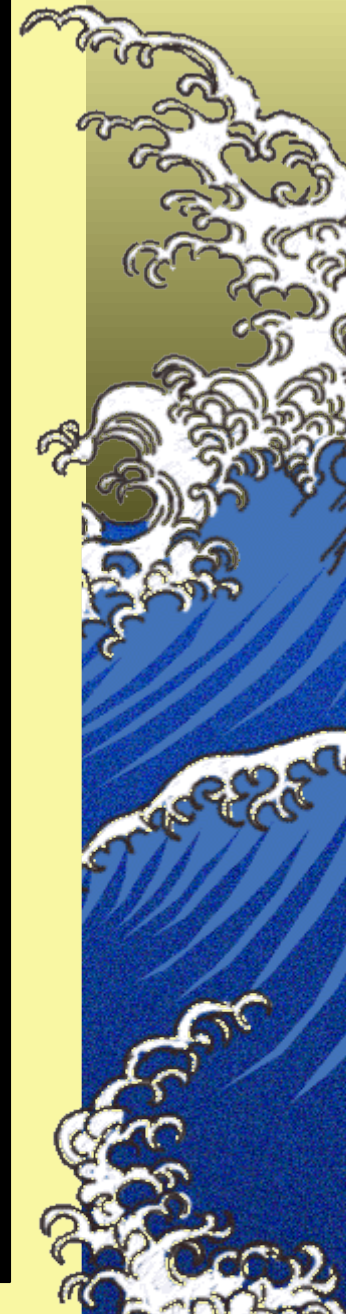
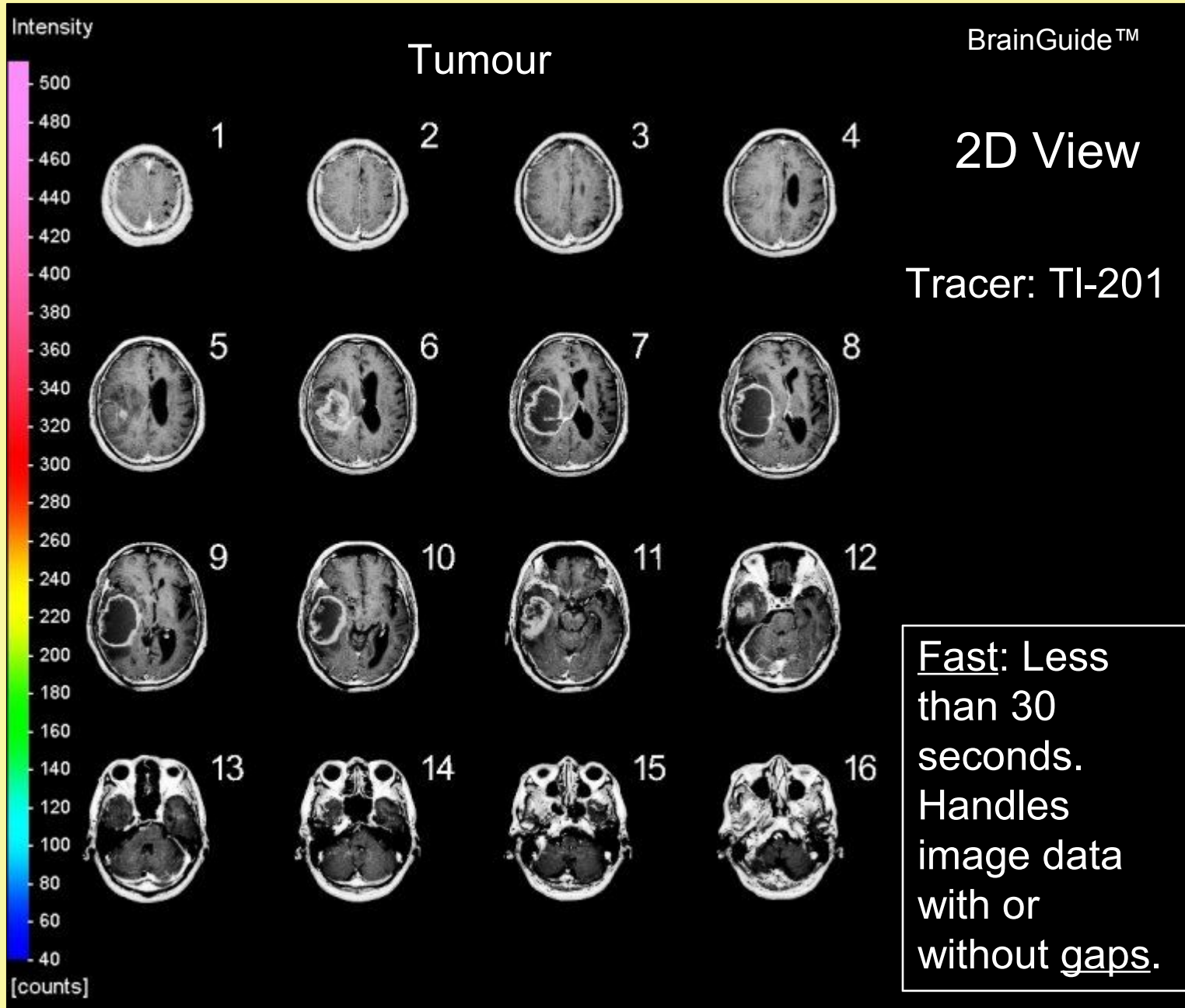
BG: 2D MRI + SPECT Image Fusion



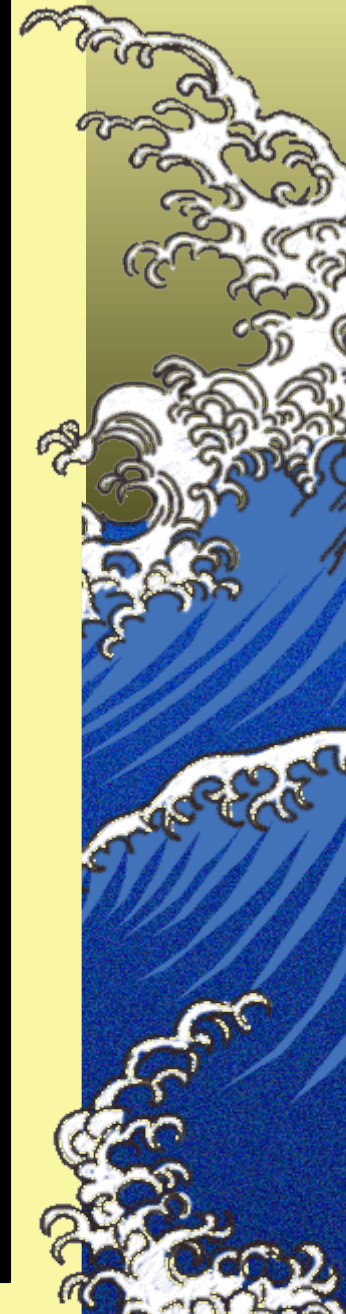
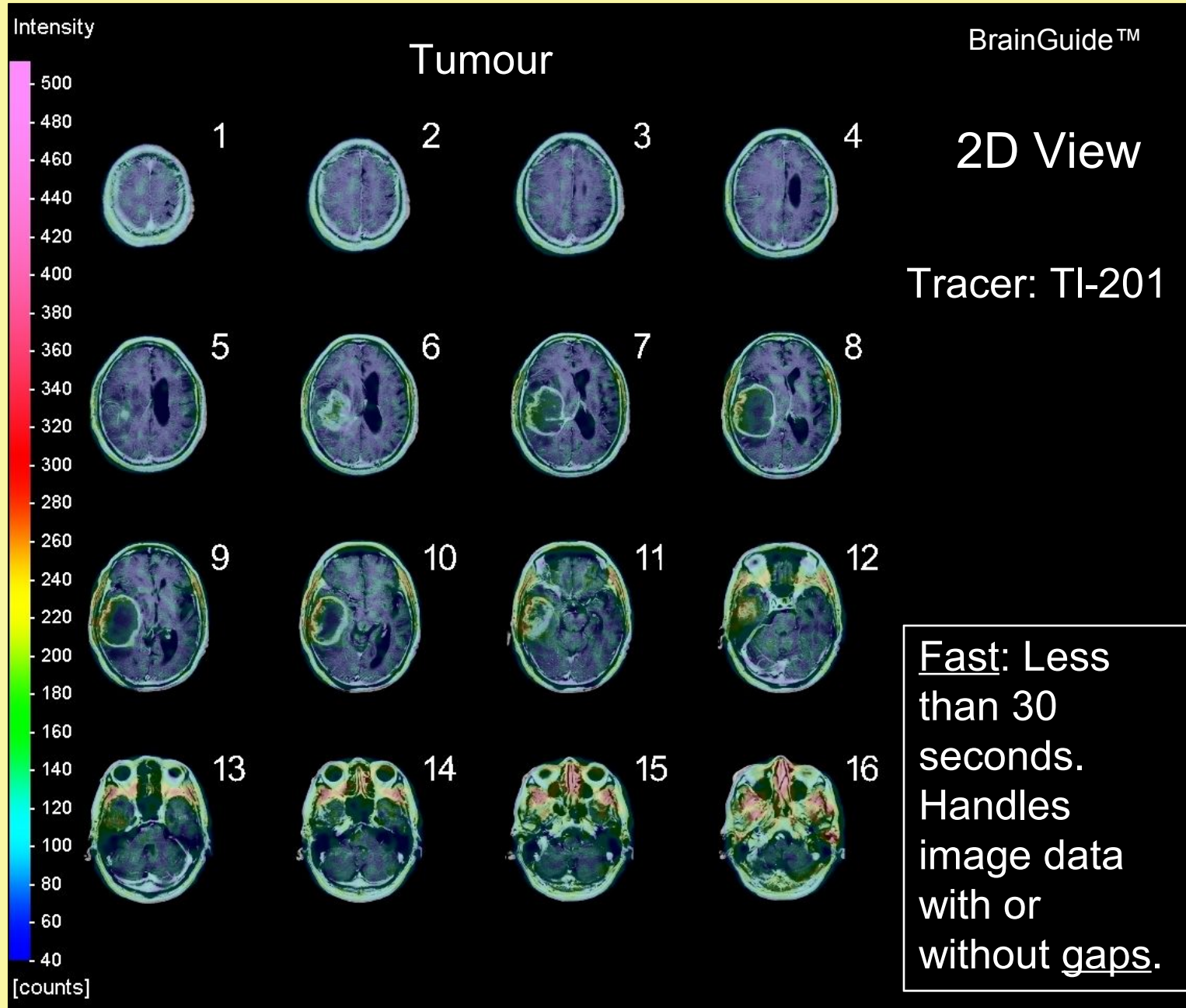
BG: 3D MRI + SPECT Image Fusion



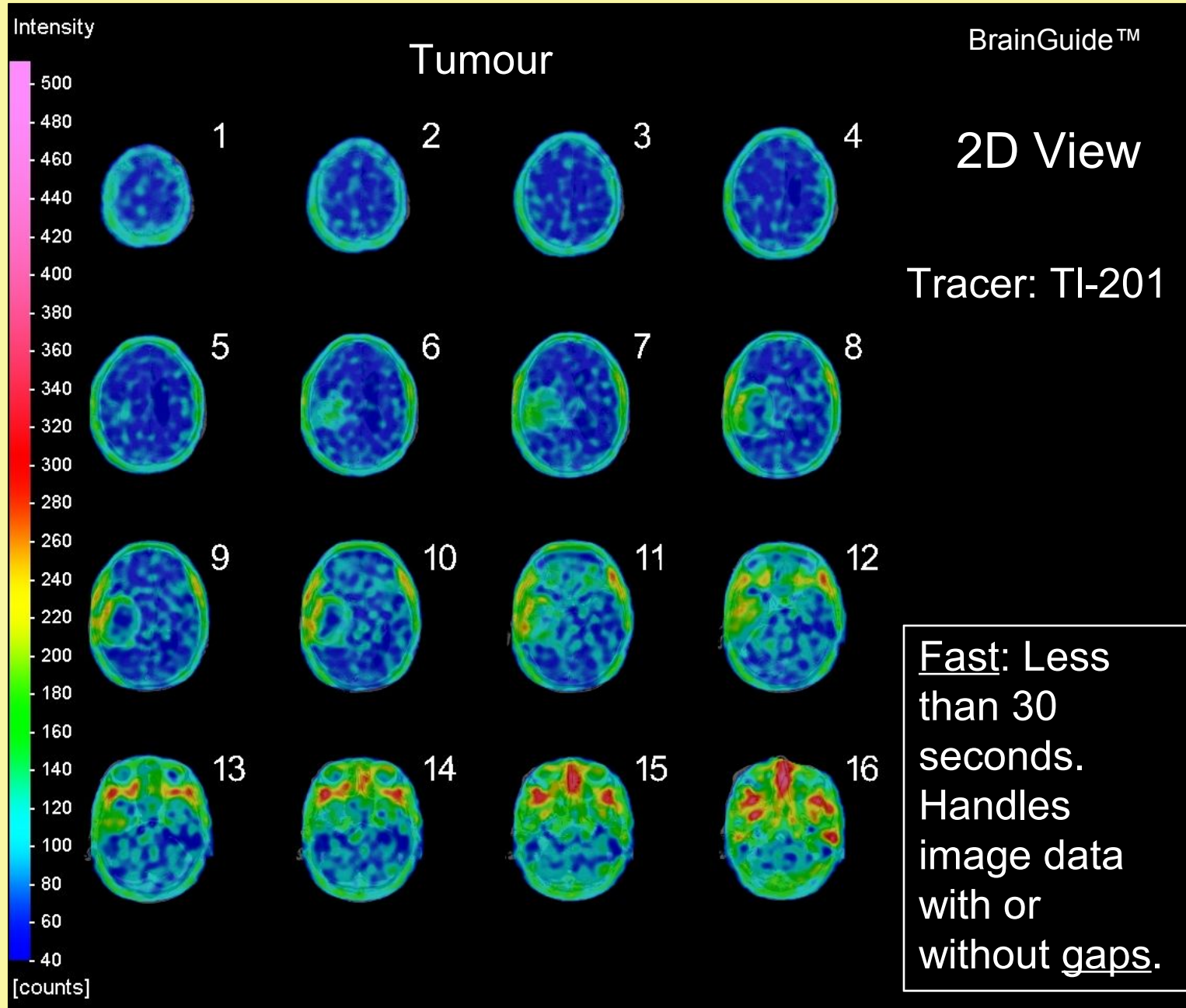
BG: 2D MRI + SPECT Image Fusion



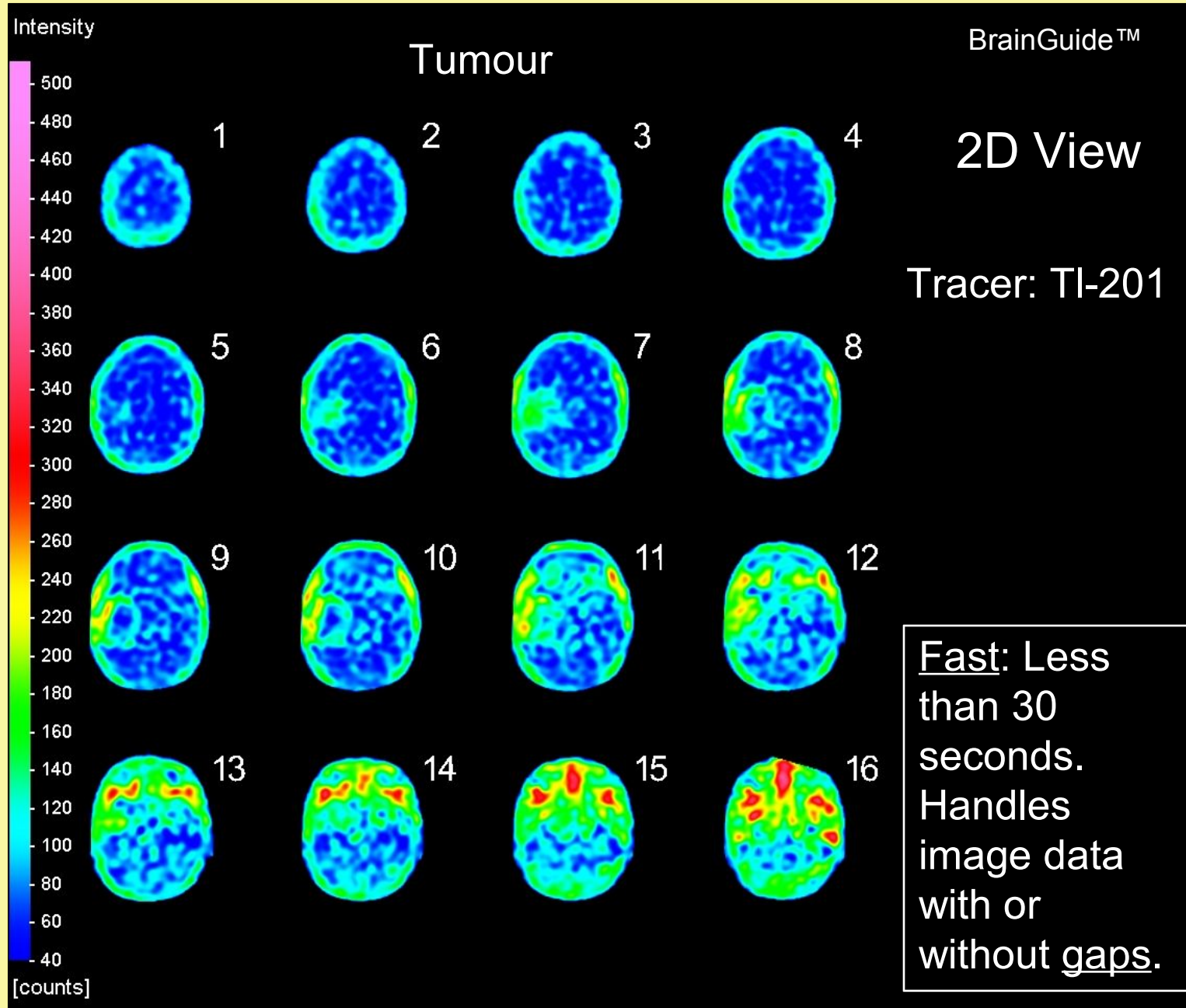
BG: 2D MRI + SPECT Image Fusion



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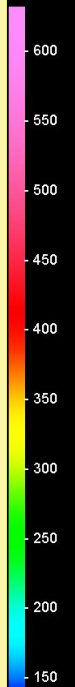
BG: 3D Volume of Interest (VOI)

5IA Neuroreceptor

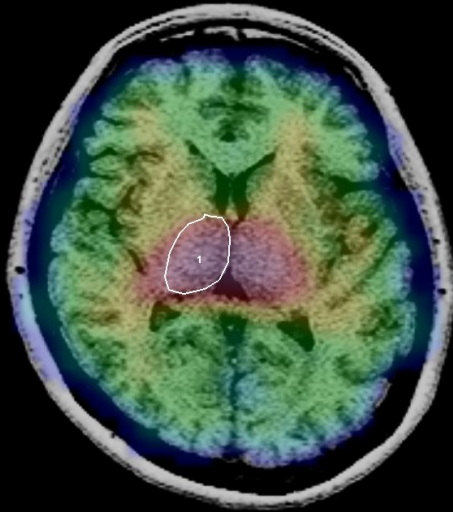
BrainGuide™

2D View

Intensity



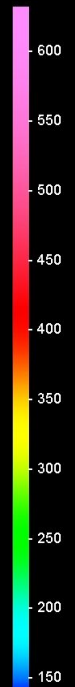
59



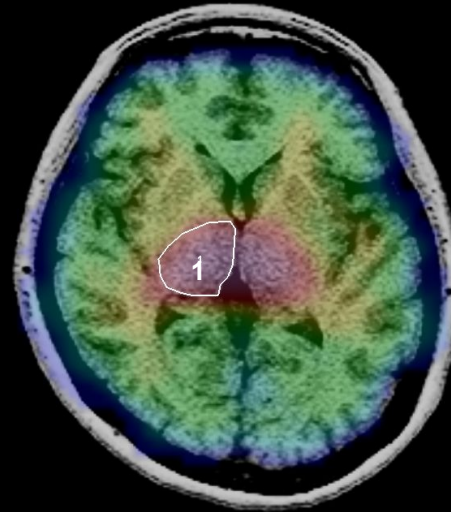
VOI	Mean +/- SD	Vol [ml]
1	468.61 +/- 65.404	43.554

[counts]

Intensity

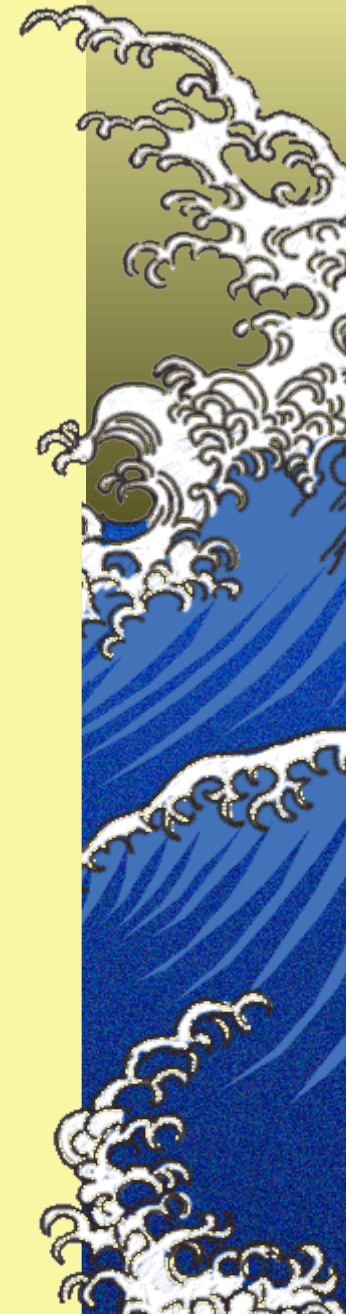


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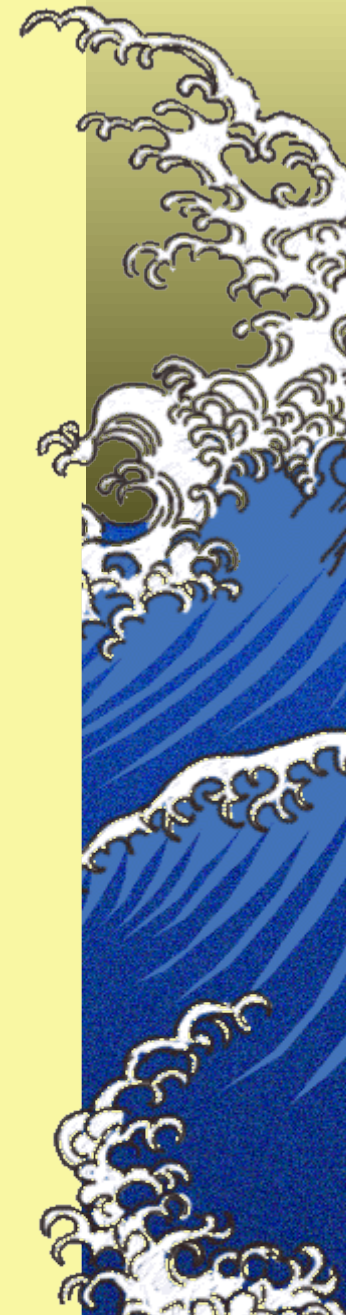
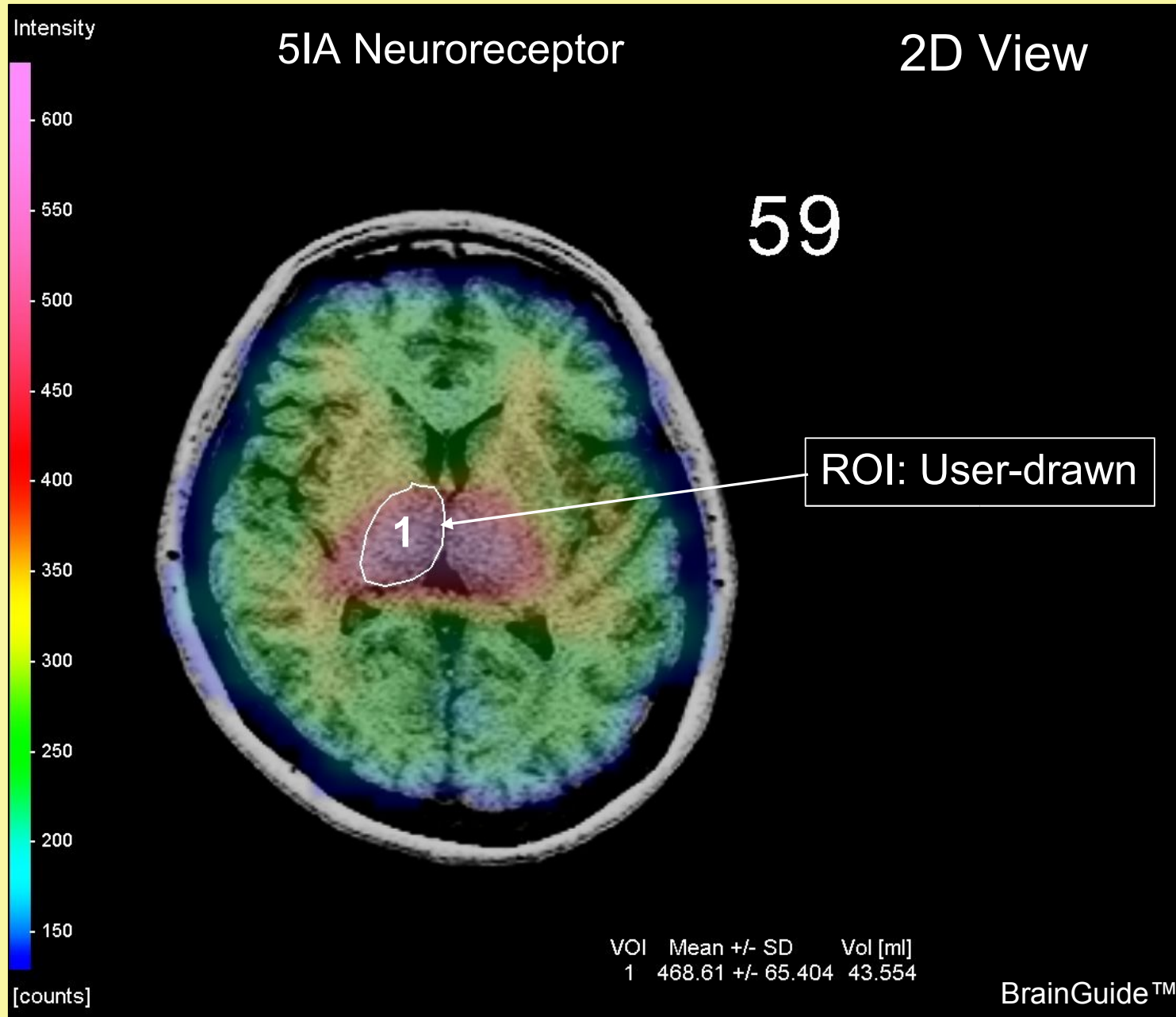


VOI	Mean +/- SD	Vol [ml]
1	468.61 +/- 65.404	43.554

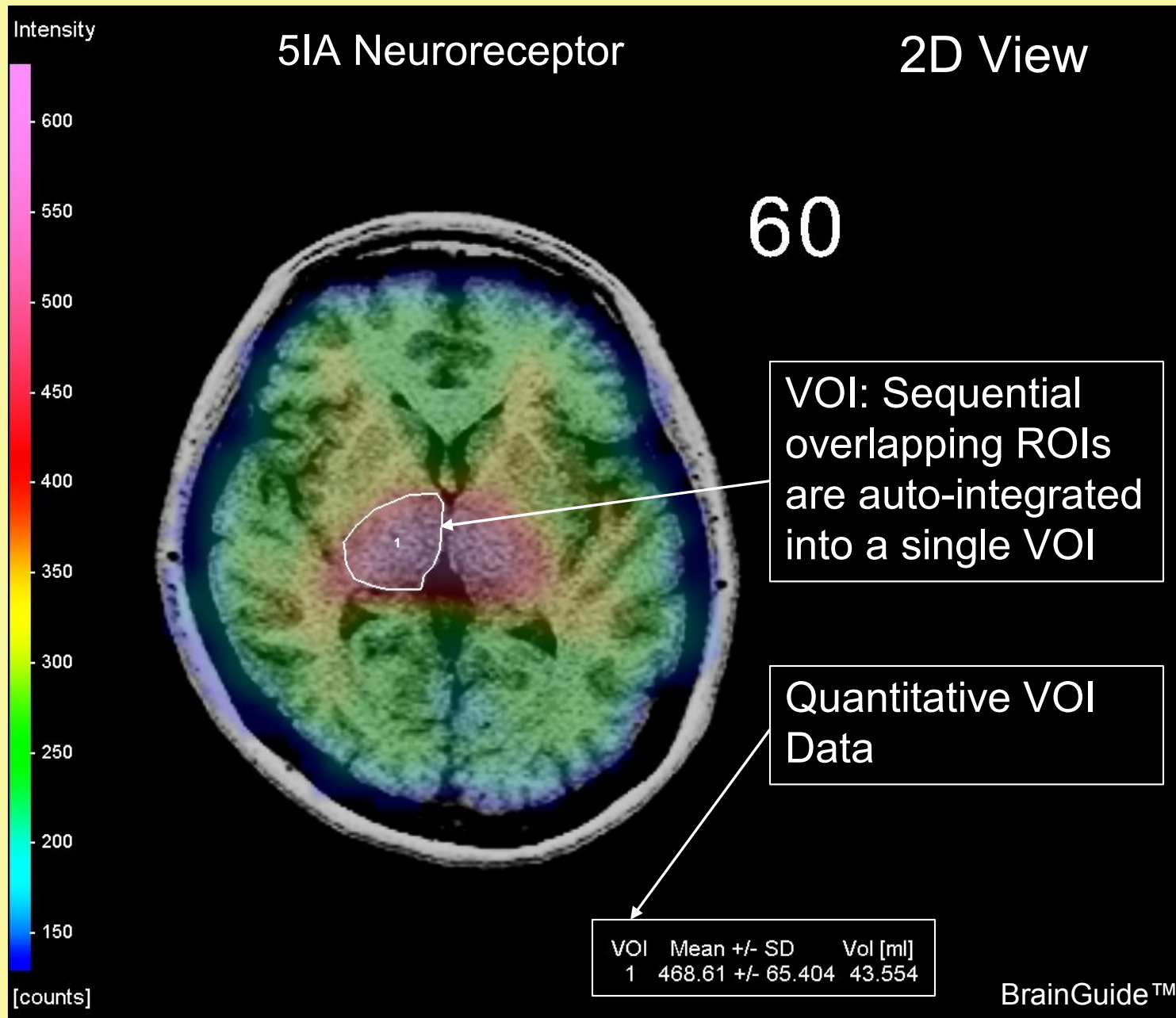
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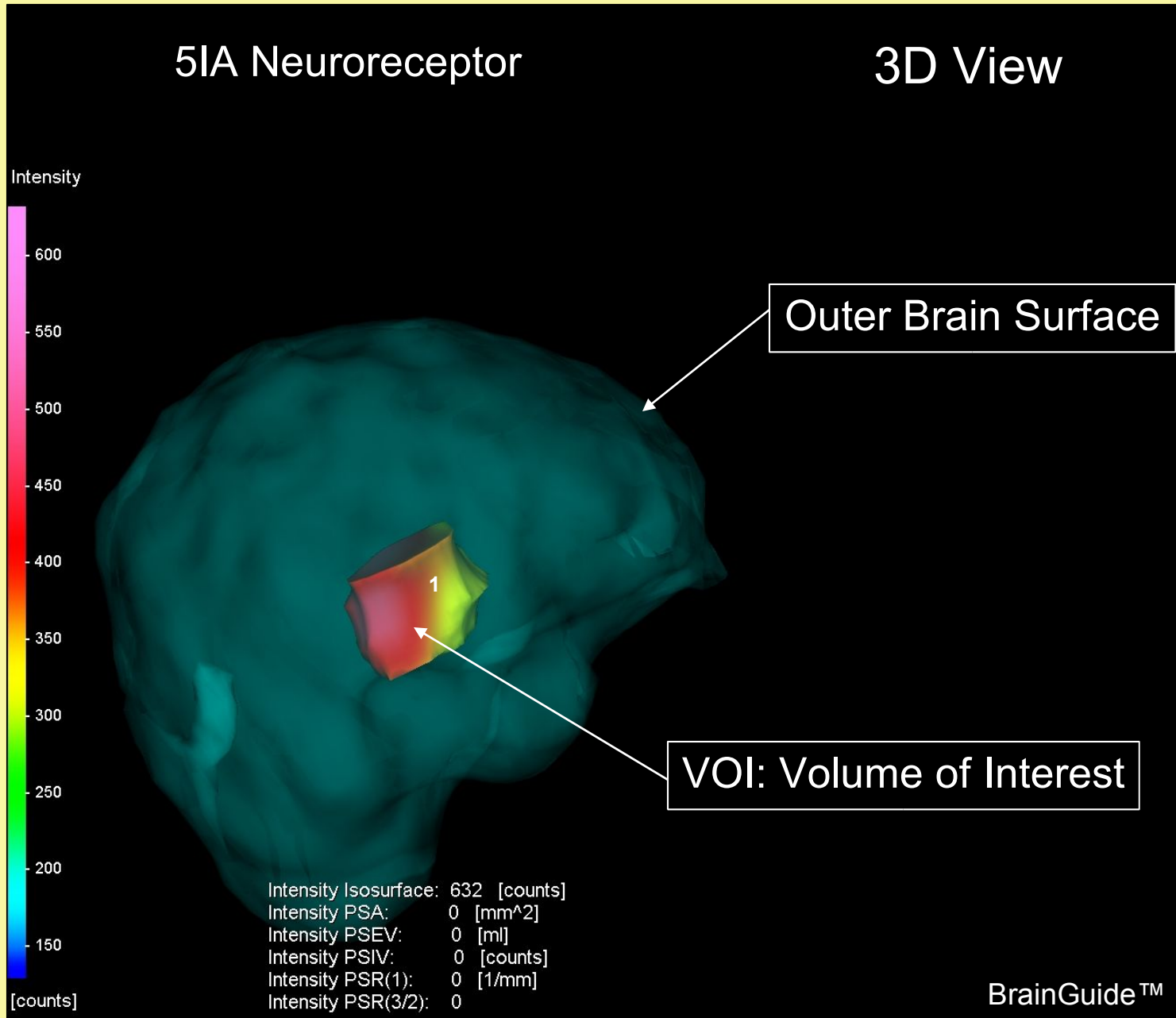
BG: 3D Volume of Interest (VOI)



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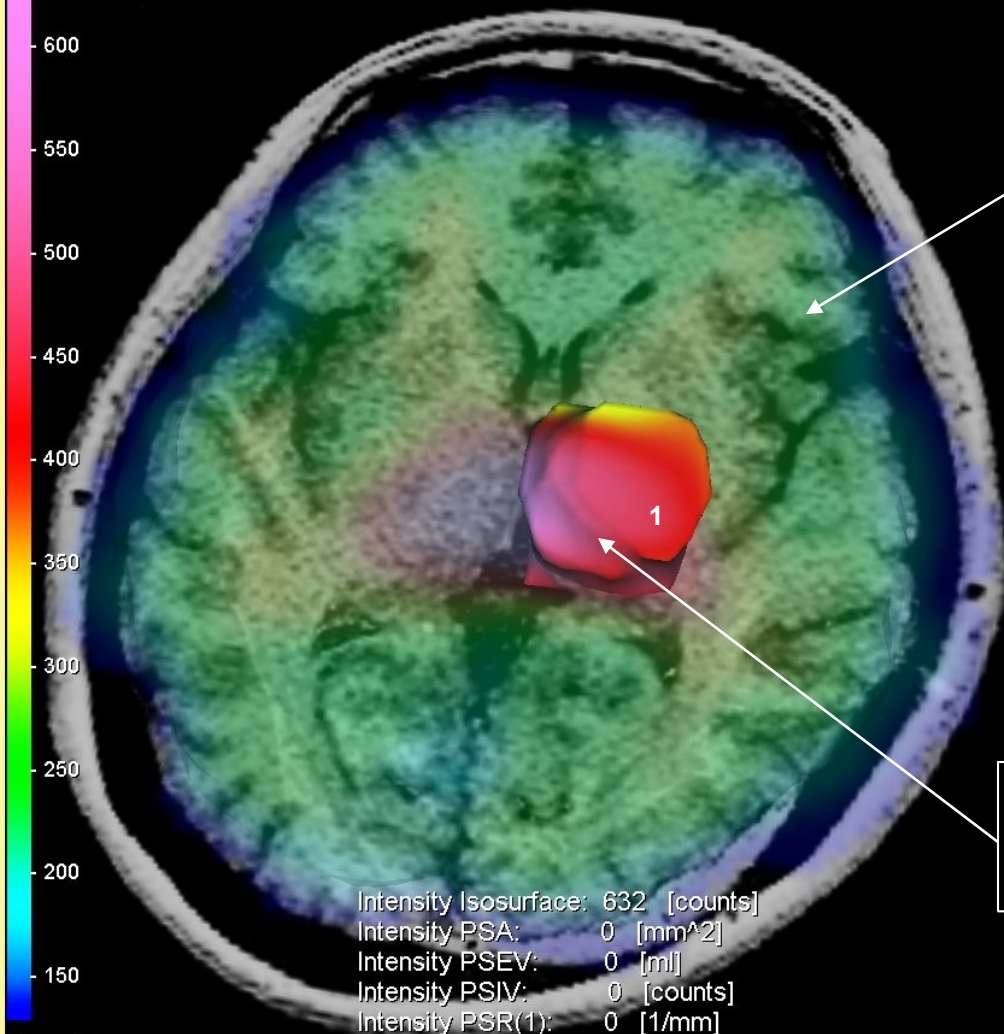
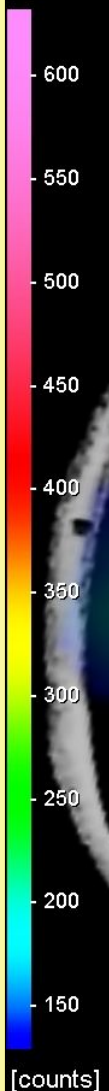


BG: 3D Volume of Interest (VOI)

5IA Neuroreceptor

3D View

Intensity



SPECT + MRI
Image Fusion
Plane

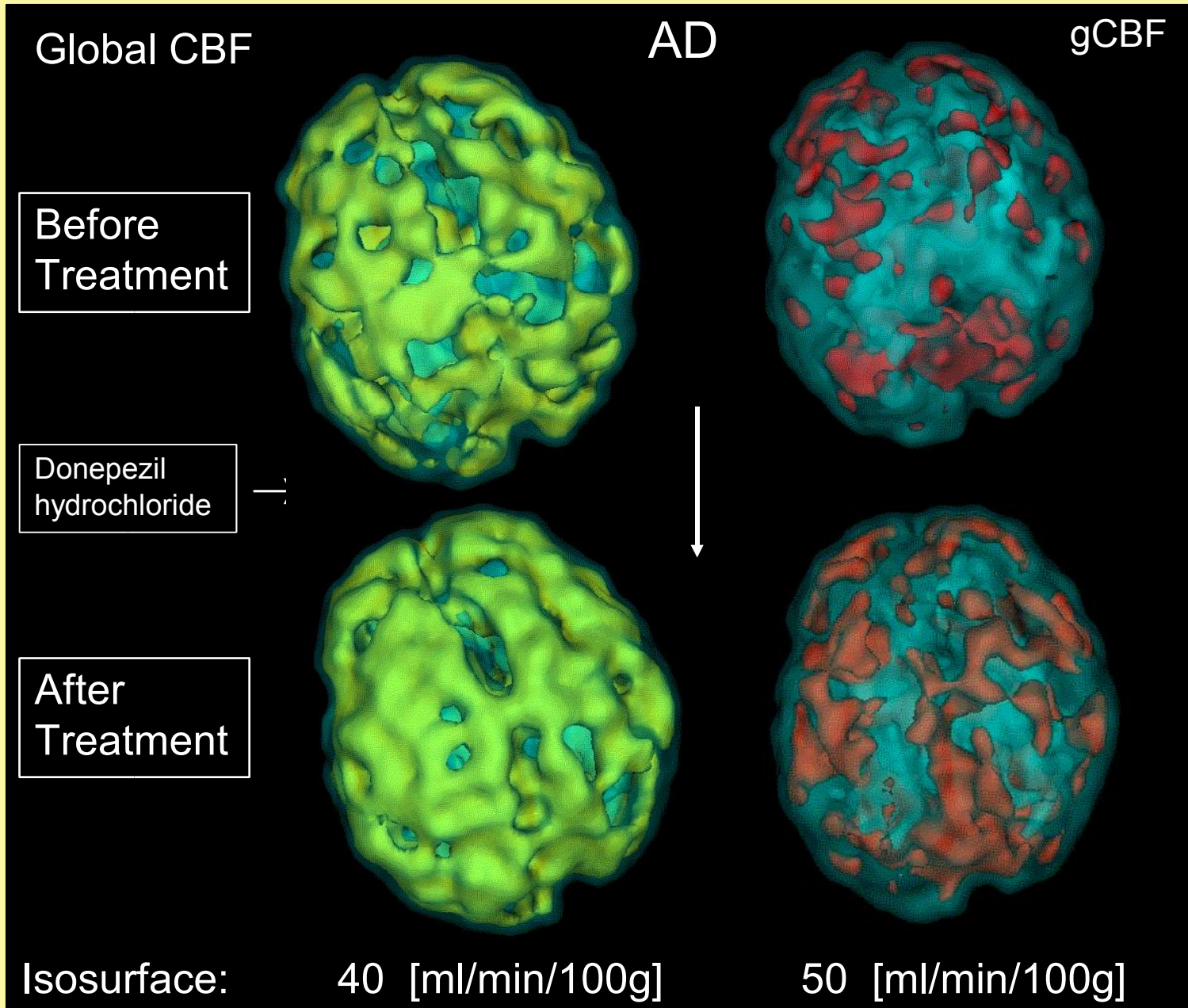
VOI: Volume of
Interest

Intensity Isosurface: 632 [counts]
Intensity PSA: 0 [mm²]
Intensity PSEV: 0 [ml]
Intensity PSIV: 0 [counts]
Intensity PSR(1): 0 [1/mm]
Intensity PSR(3/2): 0

BrainGuide™



BG Application: Alzheimer's Assessment



Galileo|BrainGuide: The Future

Next major release is BrainGuide 3.1

- **VOIs:** Automatic patient-specific VOI template generation.
- **Tracers:** ECD quantification.
- **Automatic Dynamic Imaging:** Automatic VOI time-activity curve generation, 3D parametric mapping, and neuroreceptor imaging with partial volume correction.
- **Quantitative Diagnostic Aids:** Compare same-patient image data generated over a period of time and quantify changes in brain functionality and activity. Generate a defect probability (D-Prob) for each region of an individual patient's brain relative to previous scans of the same patient or a normal patient population pool.

