

Применение лазеров в медицине



Профессор Власова О.Л.
Кафедра медицинской физики

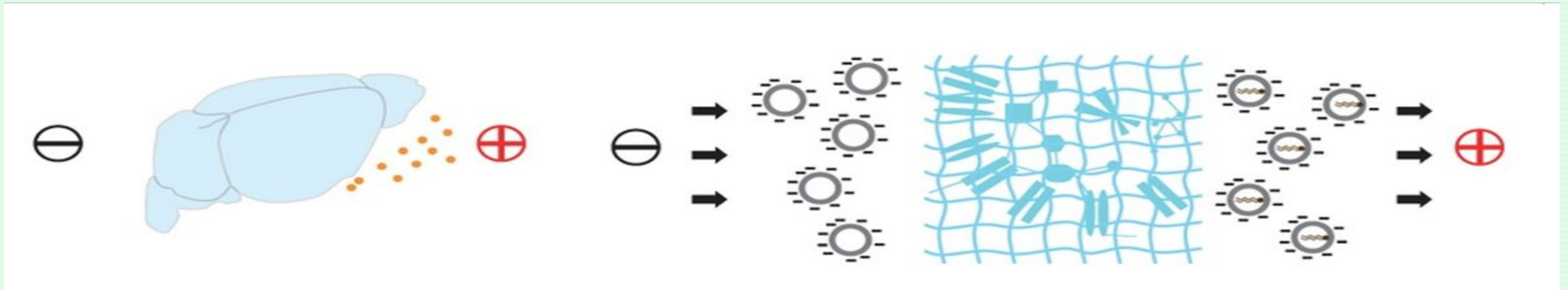
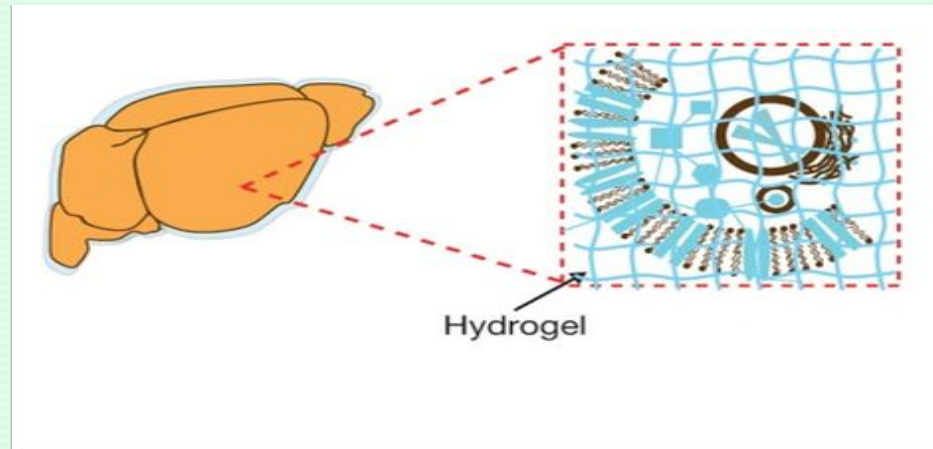
Института физики, нанотехнологий и телекоммуникаций
Санкт-Петербургский Политехнический университет Петра
Великого

- Перспективные современные исследования на клеточном и молекулярном уровне обязательно включают этап лазерных технологий.
- Технологии световой микроскопии с применением лазеров постепенно переходят на новый уровень – исследования в объеме.

Brain structures visualizing using CLARITY protocol for immunochemical studying of optically transparent mouse brain

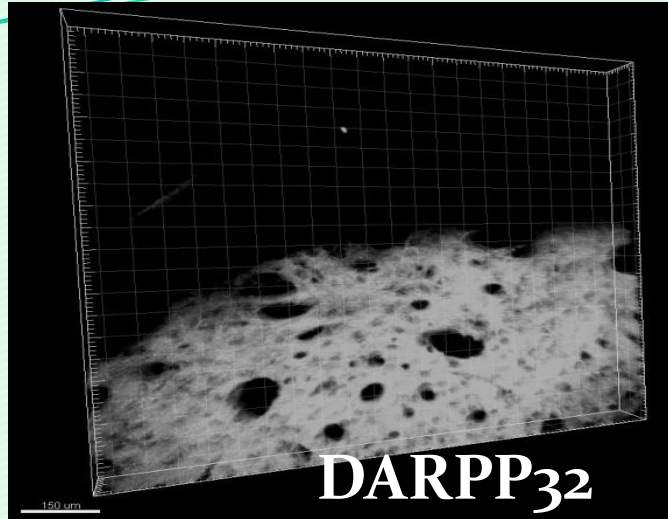
CLARITY (Clear, Lipid-exchanged, Anatomically Rigid, Imaging/immunostaining compatible, Tissue hYdrogel)

It was developed by [Karl Deisseroth](#) and his colleagues at the [Stanford University School of Medicine](#).

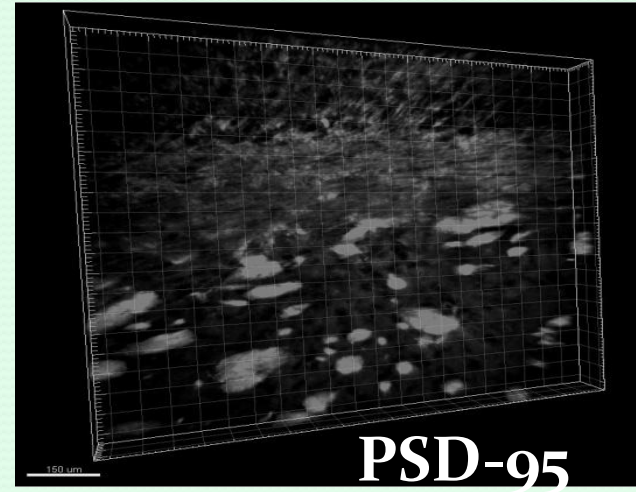


PSD-95, DARPP-32 staining. Cortex and striatum region

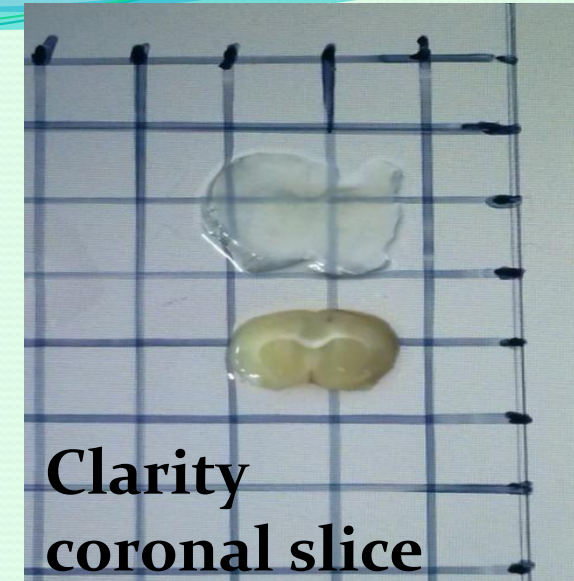
A



B



E

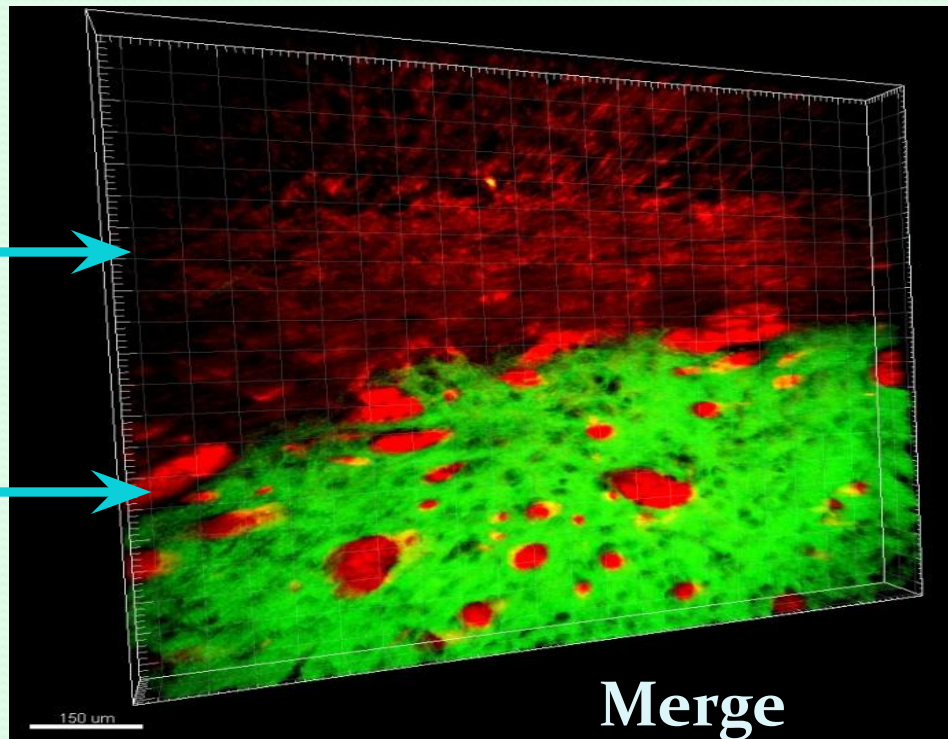


C

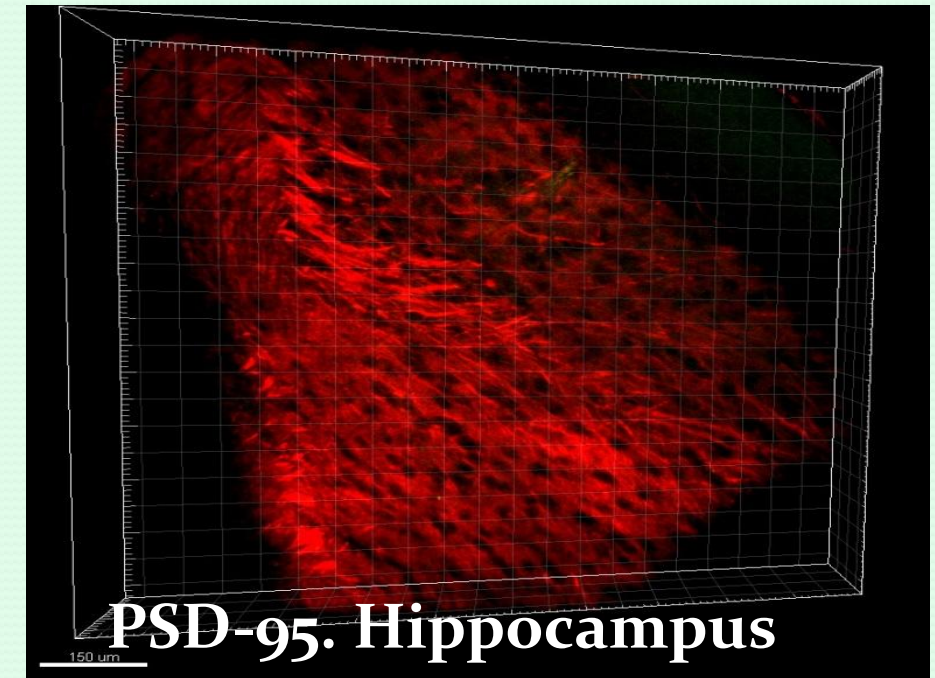
Cortex



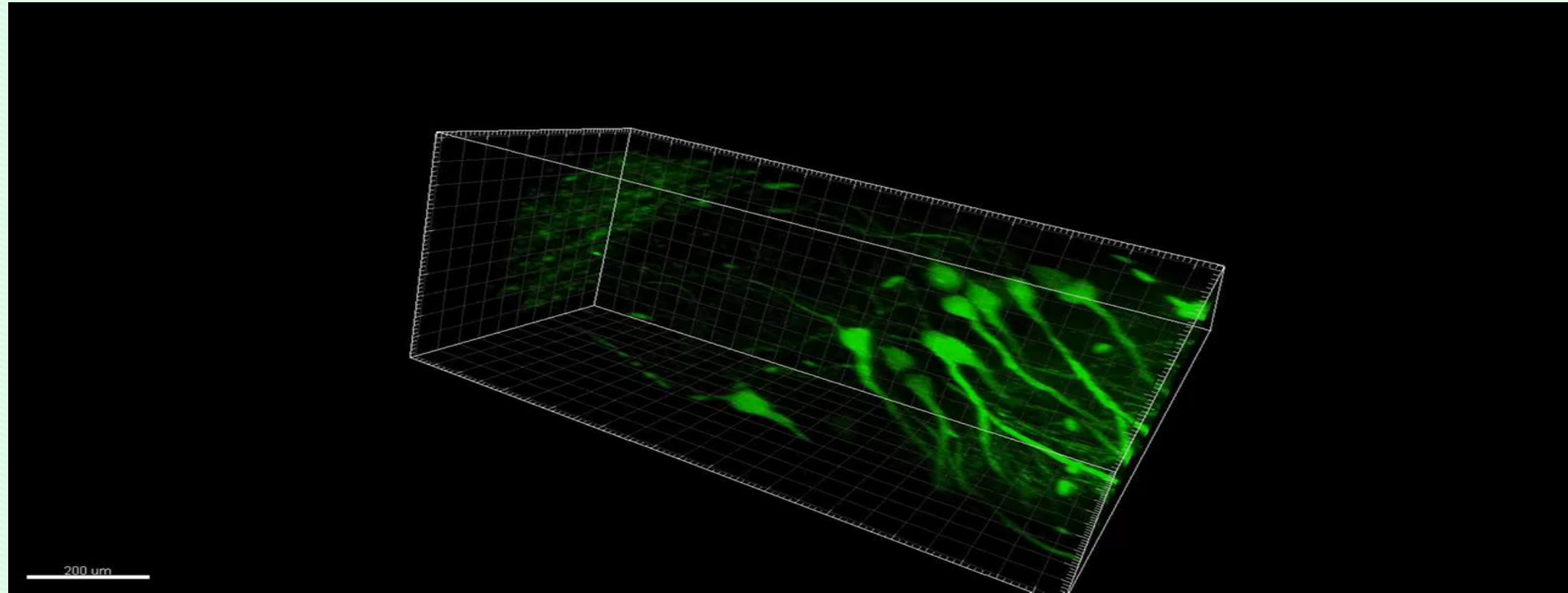
Striatum



D

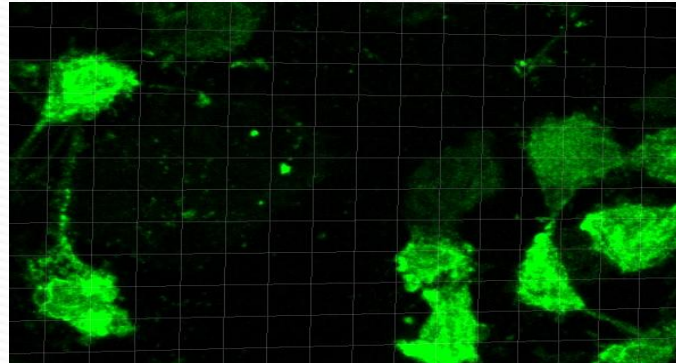
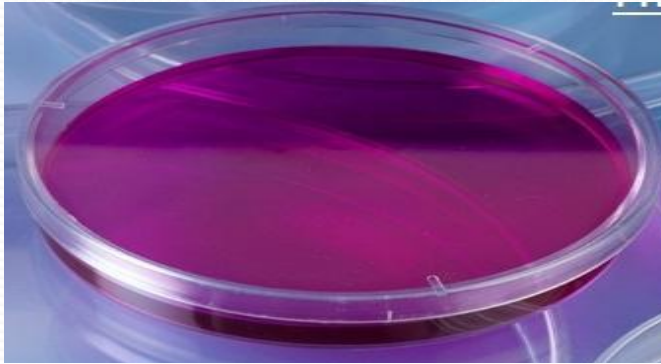


Thy1-GFP M-line
Hippocampal neurons
3D reconstruction



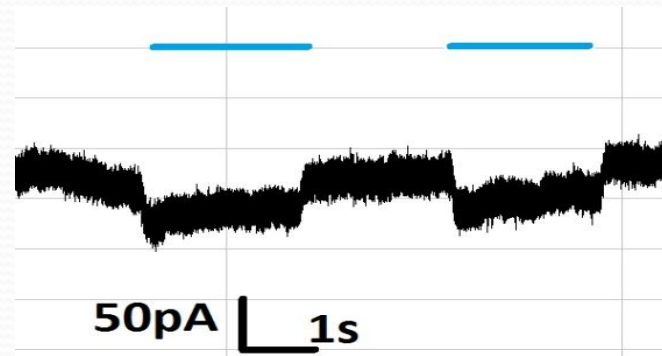
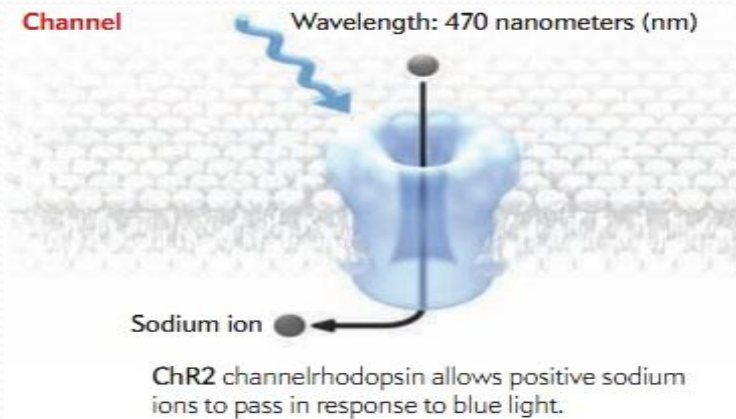
Ontogenetic project

Step 1: *transfection*



Cell culture: HEK-293T
Use: ChR2
(*Channelrhodopsin2*)
Control: RFP (green light)

Step 2: *activation opsins with light*



Recording: patch-clamp
Configuration: whole-cell
Light: blue (470nm)

Change configuration under light

Methods and techniques

- Nerve cell isolation and cell culturing
- Cell transfection
- Confocal and Multiphoton fluorescence microscopy
- Proteomics: protein electrophoresis and western blot analysis
- Genotyping
- Optogenetics