

Cellvizio[®] Lab

in vivo fibered confocal microscopy for small animal research

See what Matters. Now



Mauna Kea Technologies

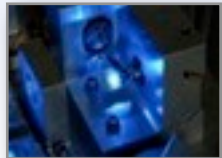


2011
FDA, CE Cleared
Cellvizio 100

2000 - 2010 : a decade of innovation

2011
200 Cellvizio® in 15 countries

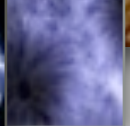
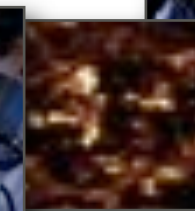
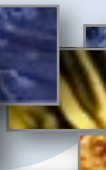
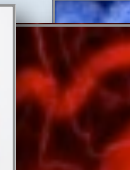
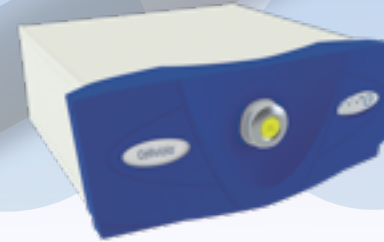
2005
Cellvizio®GI, Cellvizio®LUNG



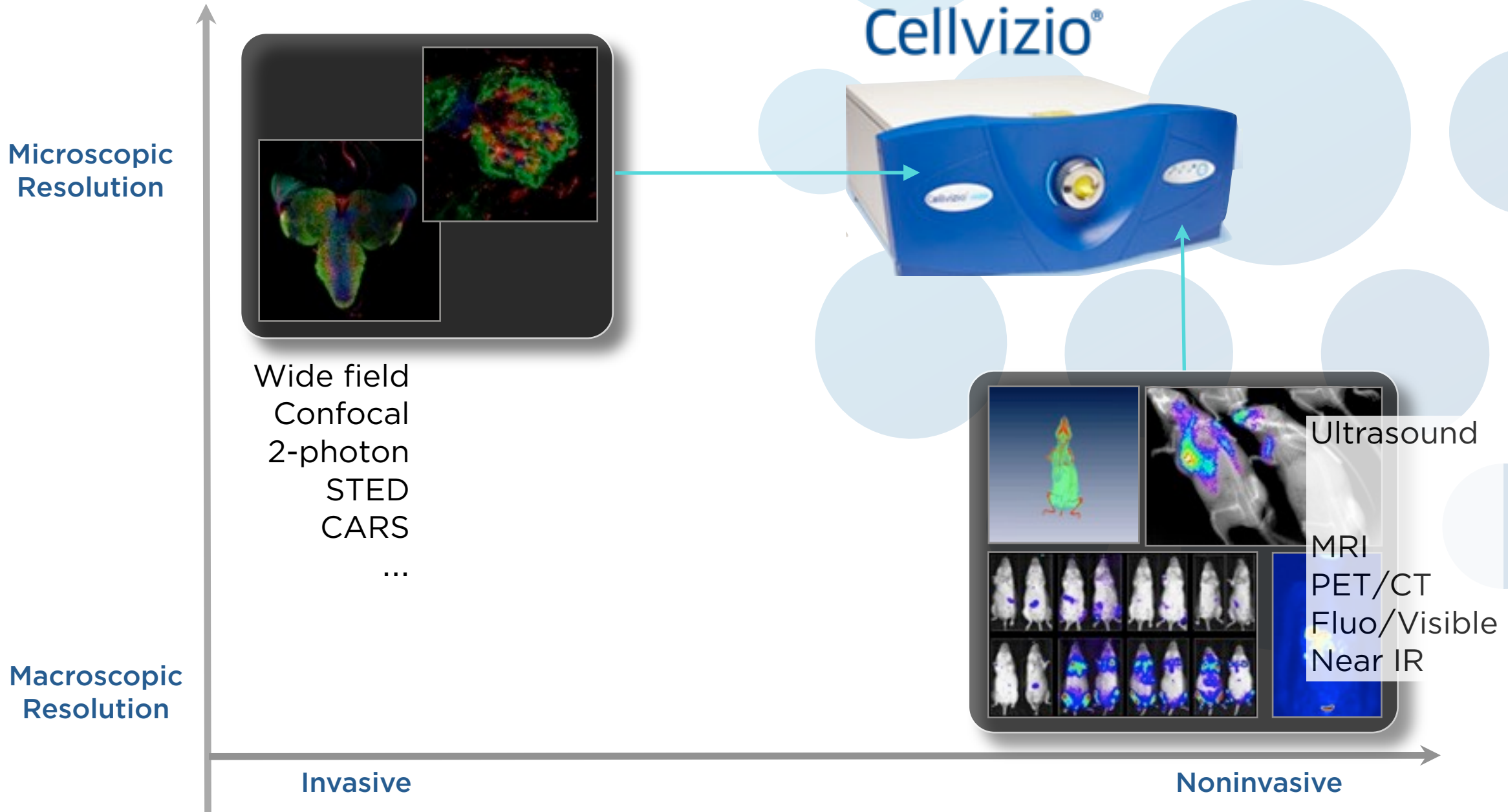
2004
Cellvizio® LAB



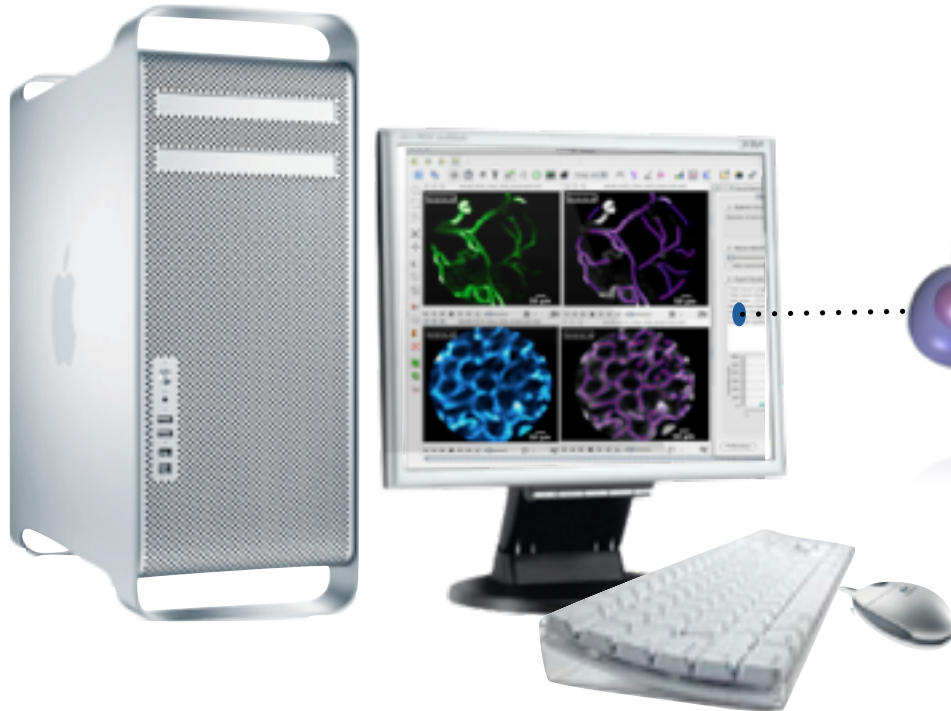
2000
Mauna Kea Technologies



Where does Cellvizio system fit



Cellvizio[®]: Confocal Laser endo-microscope



ImageCell[™] Software

- Real-Time image processing
- Quantification features
- Framerate up to 200 fps
- LSU control



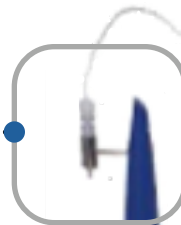
Laser Scanning Unit

- Confocal Microscope
- 488 or 660 nm excitation beam
- Single-photon detection (APD)
- Handy, turn-key, easy-to-use



ProFlex[™] Miniprobes

- Designed for different applications.....
- High Resolution: up to 1.4 μm
- Thin Diameter: down to 300 μm



Foot Pedal

- ImageCell[™] remote control



Microprobes: Choose Yours!

	Model	Applications	Tip Diameter (mm)	Lateral Resolution (μm)	Optical Sectioning (μm)	Working Distance (μm)	Max Field Of view (μm)
N E W	CerboFlex	Deep brain imaging, designed for permanent implantation on freely moving mice	0,35	3,3	15	0	325
	Weight < 0,4g	Part of the NeuroPac™ solution					
S Series	5-0300*	Brain, deep brain in mice, other organs at depth if low invasiveness is mandatory	0,3	3,3	15	0	300
	5-0650*	Brain, deep brain in rats, other organs at depth if low invasiveness is mandatory	0,65	3,3	15	0	600x500
	5-1500	General applicability, can be used to check fluorescence sensitivity in most targets	1,5	3,3	15	0	600x500
M Series	Ultra MiniO	Vessels, angiogenesis, cell fate, cell morphology, utility depends on cell layer thickness and invasiveness	2,6	1,4	10	60	240
	MiniO/30	Vessels, angiogenesis, cell fate, cell morphology, utility depends on cell layer thickness and invasiveness	4,2	1,4	10	30	240x200
	MiniO/100	Vessels, angiogenesis, cell fate, cell morphology, utility depends on cell layer thickness and invasiveness	4,2	1,4	10	100	240x200
Z Series	Z-1800	Blood flow through the vessel (without penetration) image deeper cell layers of tumor, organ or tissue	1,8	3,5	70	100/170 at 488/660	600x500
	Mini Z	Cavities, eye	0,94	3,5	30	50/70 at 488/660	320

«As thin as needles»

S Series

- The thinnest: from 300μm to 650μm
- Brain, Deep Brain, Freely-moving
- Low invasiveness mandatory

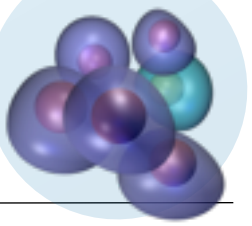
M Series

- The Highest Resolution: up to 1.4μm
- Microcirculation, Angiogenesis, Morphology, Vessels

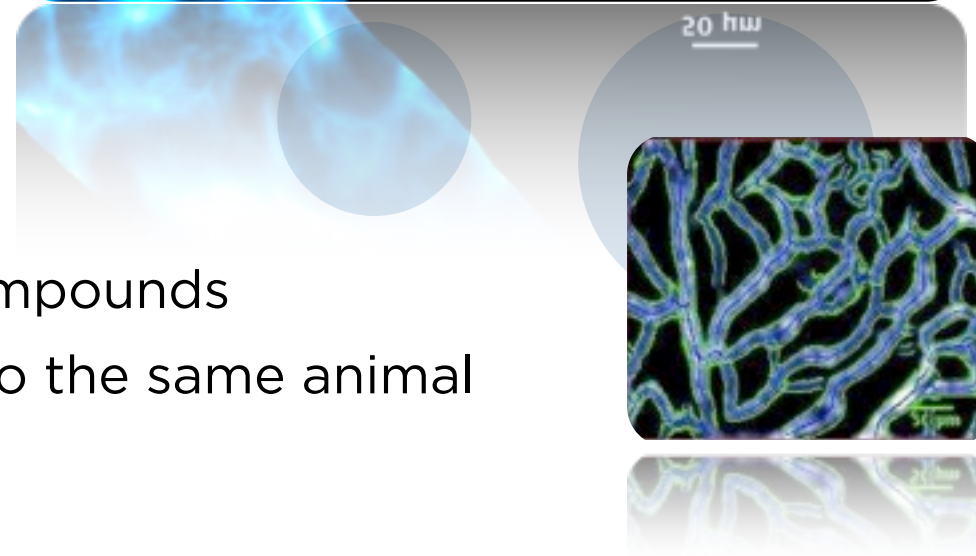
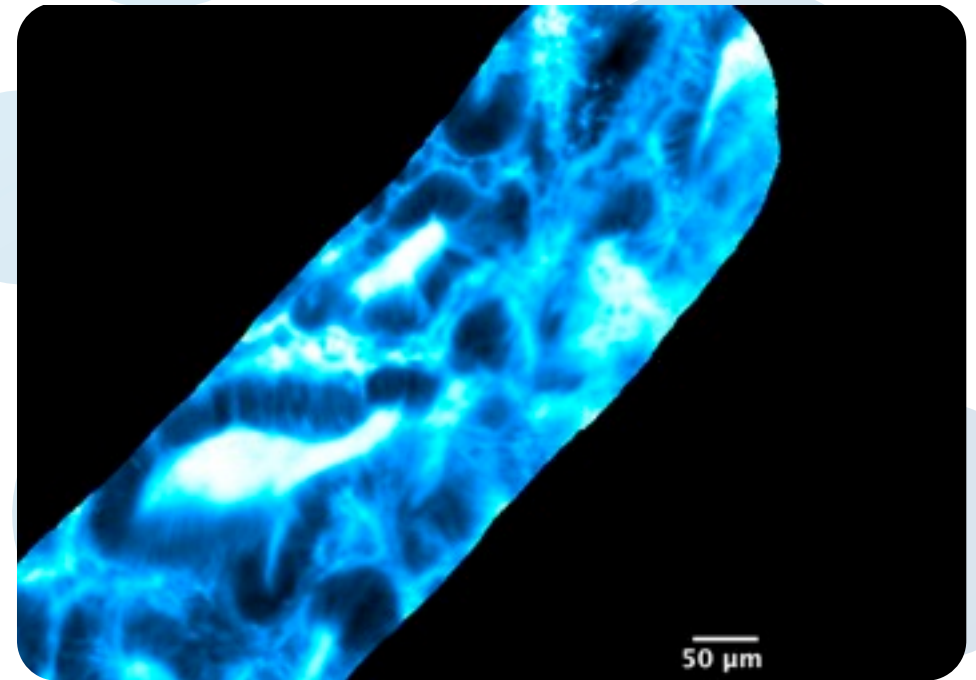
Z Series

- Go Deep: Image processes that occur at 100μm depth
- Microcirculation, Angiogenesis, Morphology, Vessels

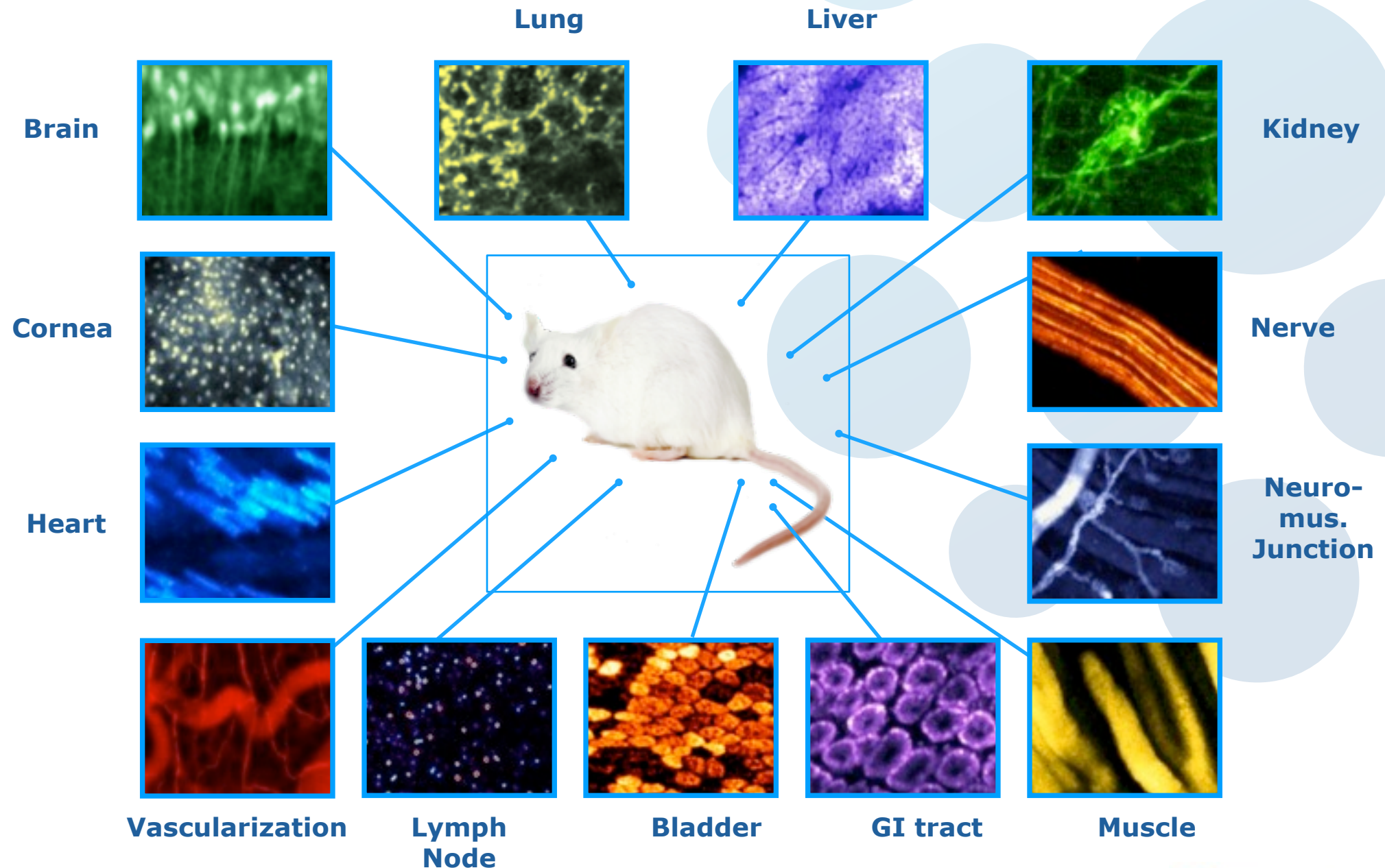
ImageCell: Quantification tools



- Advanced Mosaicing™
 - Enhanced resolution
 - Bigger field of view
 - Follow the probe's track
- ROI tracker
 - Quantify the fluorescence over time
 - Track your cells' path
- Vessel Detection™
 - Segment, measure neoangiogenesis
 - Assess the effects of anti-angiogenic compounds
 - Share relevant Data, acquired in vivo, into the same animal



A Wealth of Applications



Cellvizio® for Neuroscience

Applications

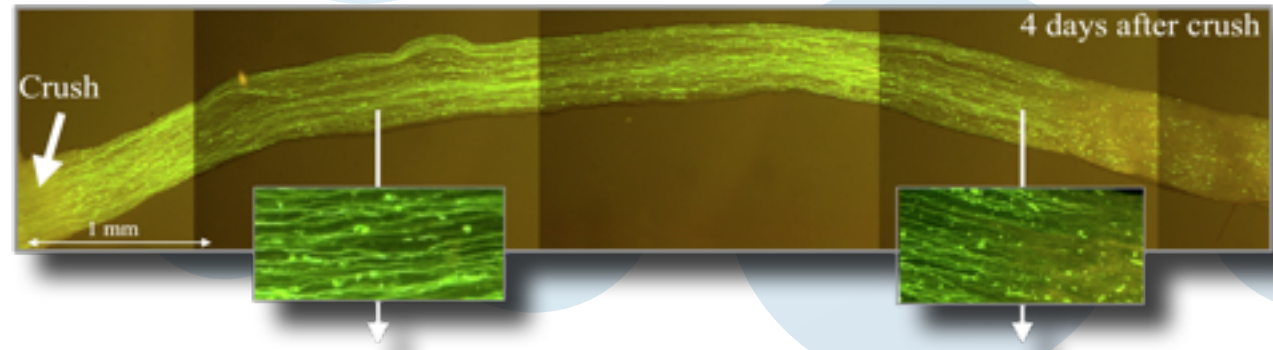
- **In vivo Deep brain imaging**
- **Neuronal activity assessment**
- **Microcirculation**
- **Microglial activation**
- **Freely-moving animal : Associate behavioral studies to neuronal activation**
- **Epilepsy, Alzheimer, Parkinson, Addictions...**
- **Animal model evaluation**

Cellvizio® for the PNS

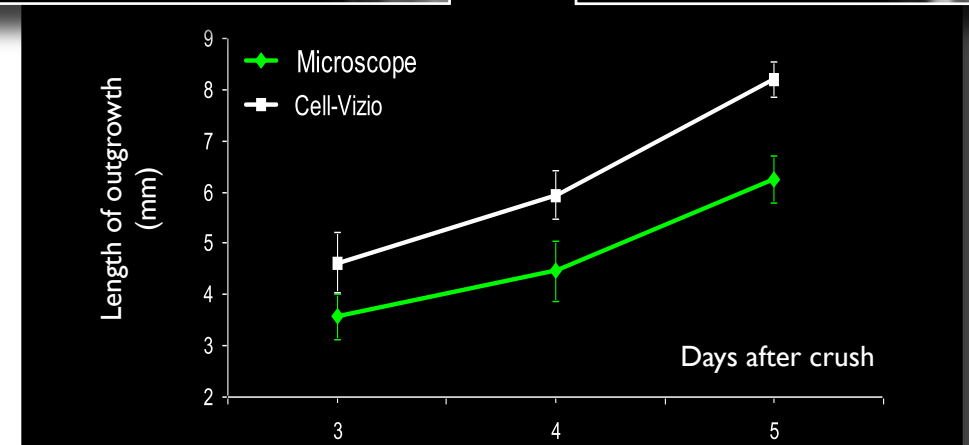
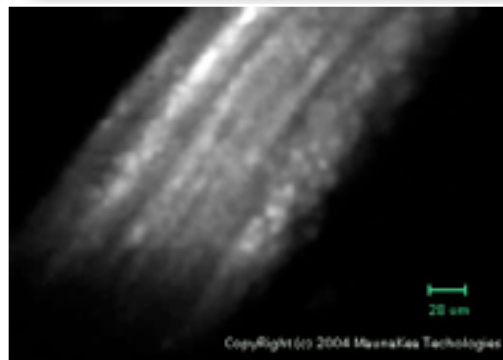
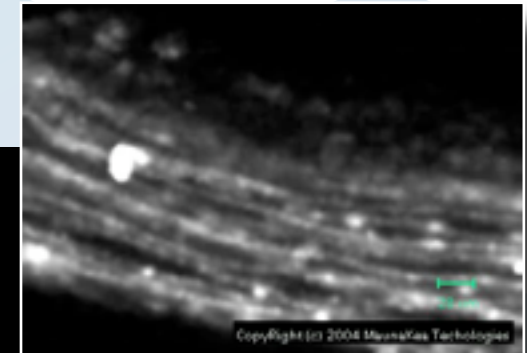
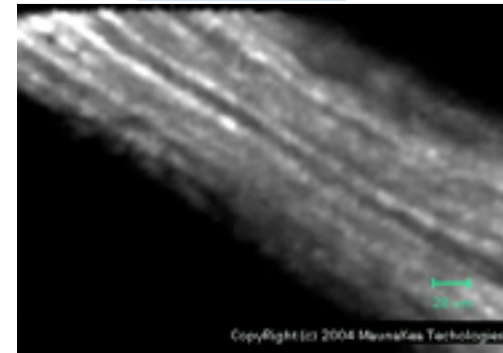
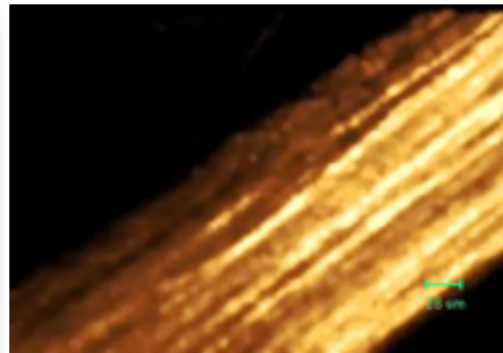
Investigation of nerve regeneration after crush injury of the Saphenous Nerve

Ex vivo :

Periodic control epifluorescence microscopy must be done, on fixed tissue. Multiple animals are required.

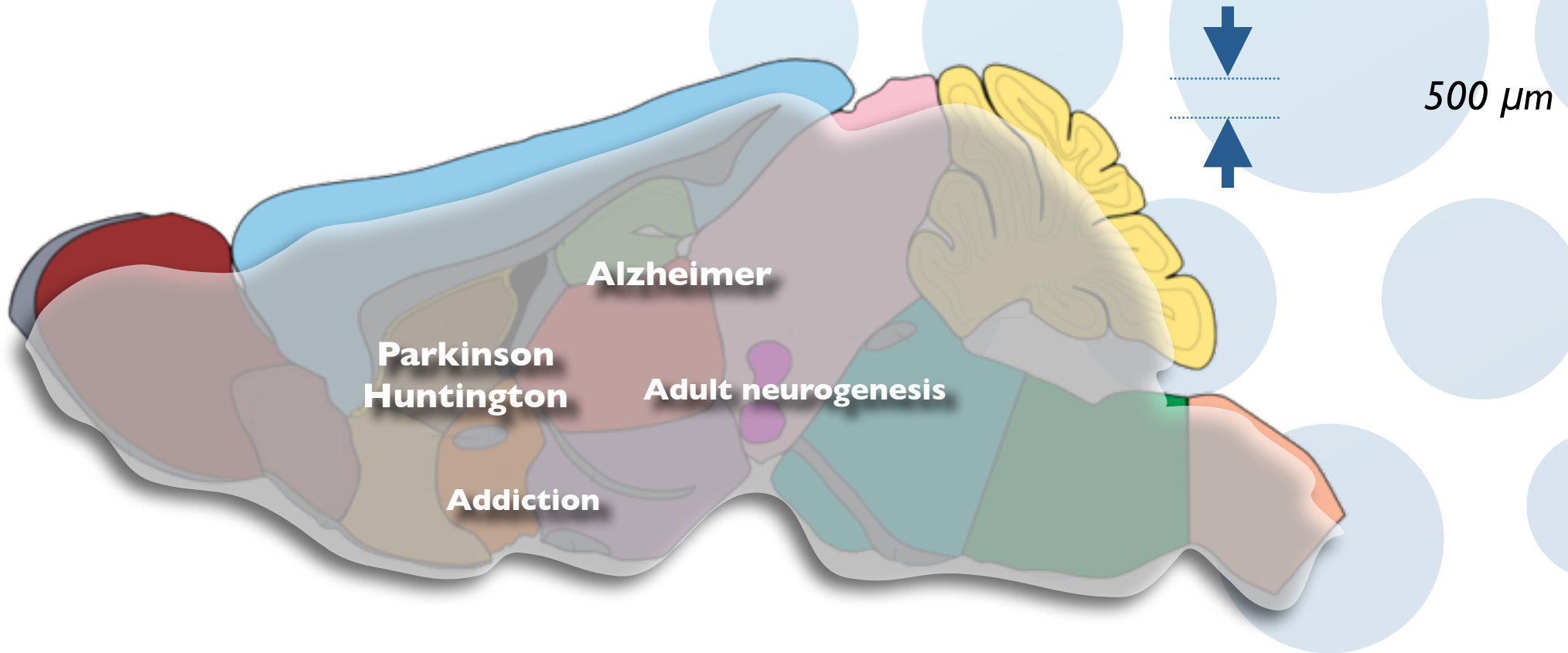


In vivo & in situ :



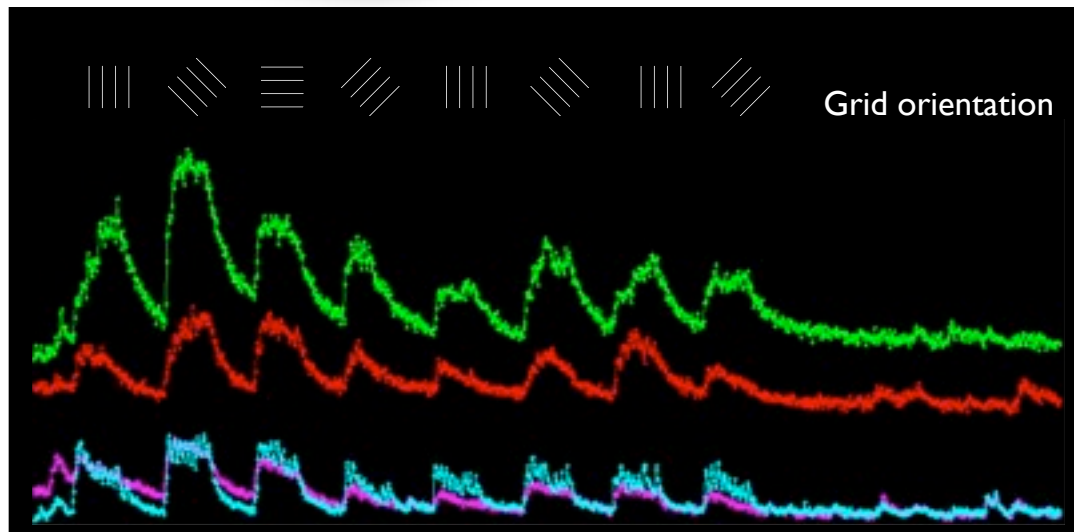
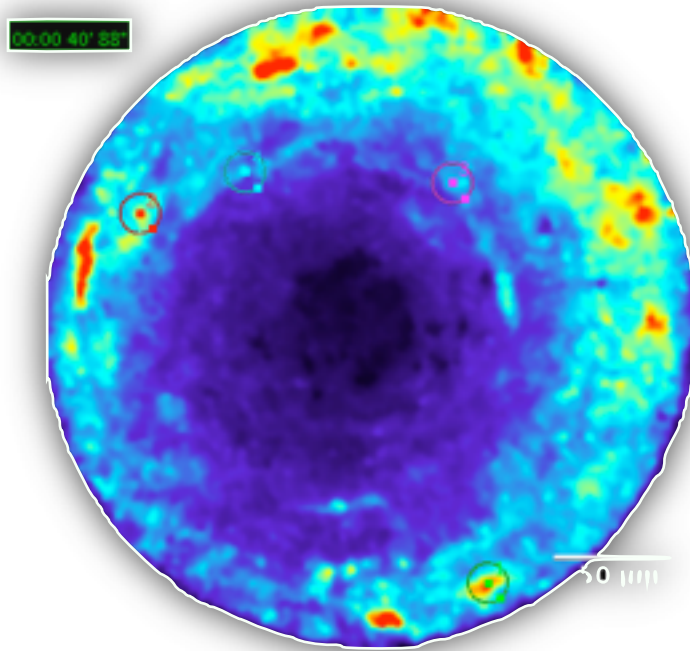
Cellvizio® for the CNS : bringing μ -scopy into the brain

To date, an immense domain remains unreachable
to cellular in vivo and in situ imaging



Mouse brain (ca 6 x 15 mm)

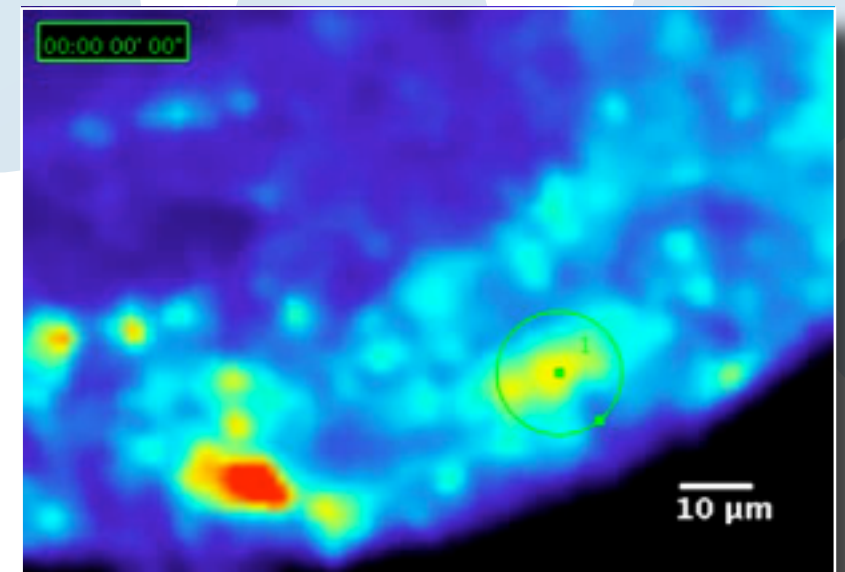
Cellvizio® for the CNS : bringing μ -scopy into the brain



Neuron Direction Specificity in Cat Visual Cortex

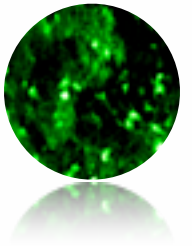
*Images acquired in layer 4 of the cat visual cortex
Cells labeled with Oregon Green BAPTA-1 by local microinjection after stereotaxic surgery*

Visual stimulation with drifting orientated patterns and grey screen in-between



*Courtesy of Aaron Kerlin, Kenichi Ohki, Clay Reid
Harvard Medical School, Boston, MA*

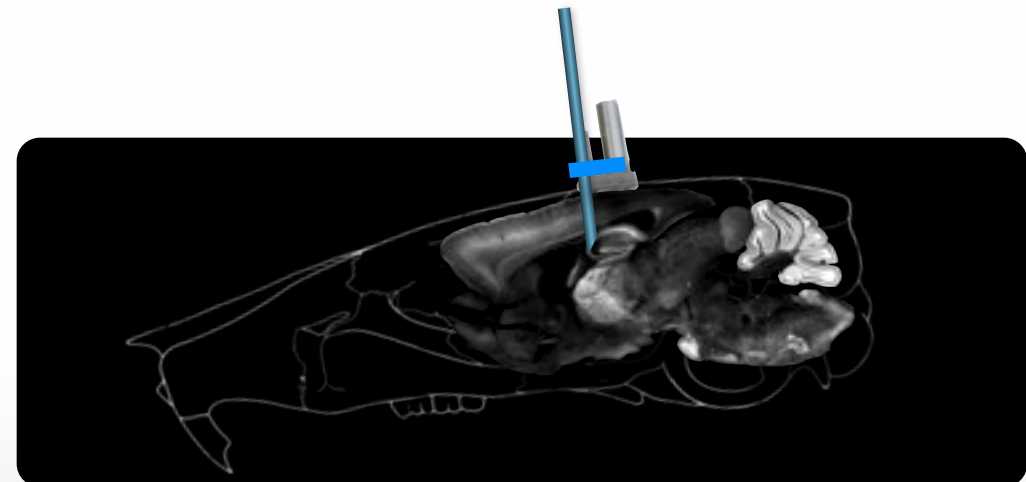
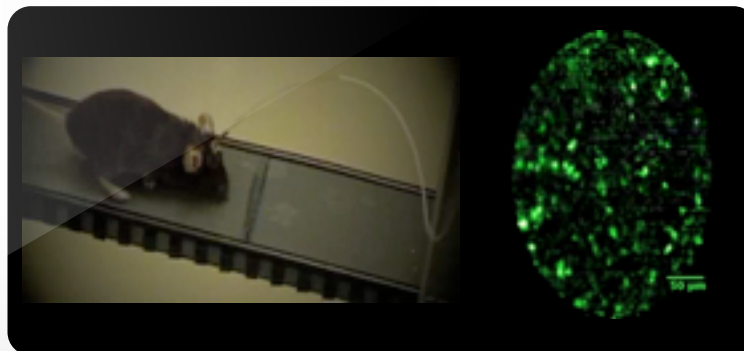
NeuroPak™ : Freely-moving imaging



Deep Brain imaging in freely moving animals

- A set of tools
- Small and Light implants: only 0,3g
- Reach the neuron activity live
- Brings the **light anywhere** into the mouse brain achieving behavioral t
- Different probe types for different **applications** and needs

Providing real-time characterization of tissues



Cellvizio® for the CNS: deep brain imaging

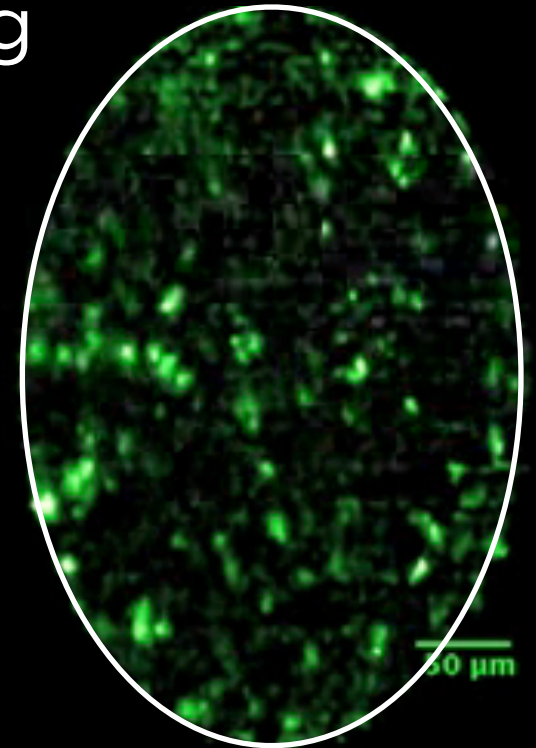
In situ, in vivo & on awake animals



Total mass < 1 g

Chronically implanted
300 μm optical image guide
real-time fluorescence
3.4 μm resolution
0 to 6 mm depth

Permanent implant



Hippocampic neurons (real-time)

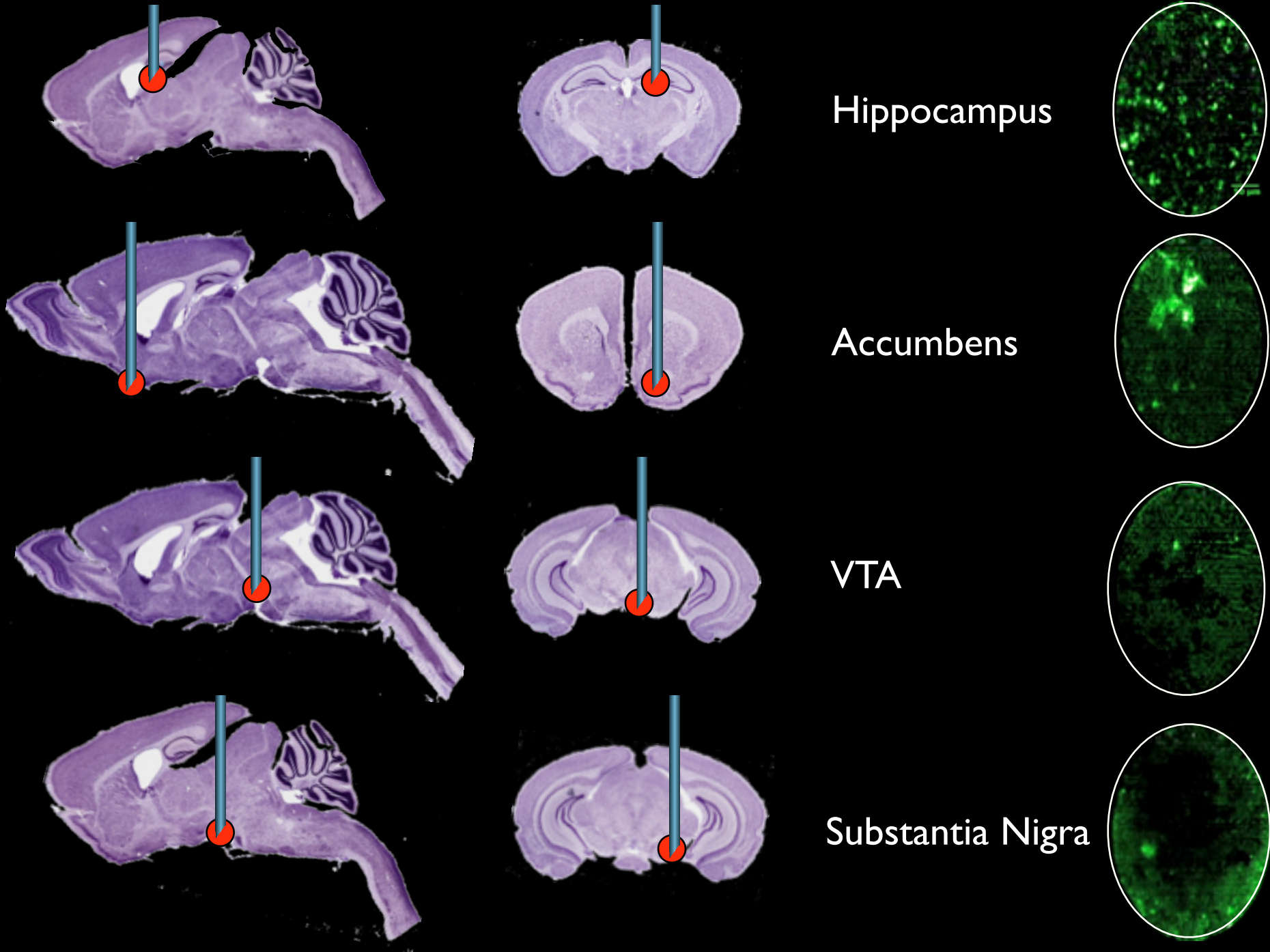


Behavioral studies + Brain Imaging

Ca²⁺ Cellvizio imaging in the hippocampus

U. Maskos (Institut Pasteur) et al, SFN 2009

Reaching multiple regions in the deep brain



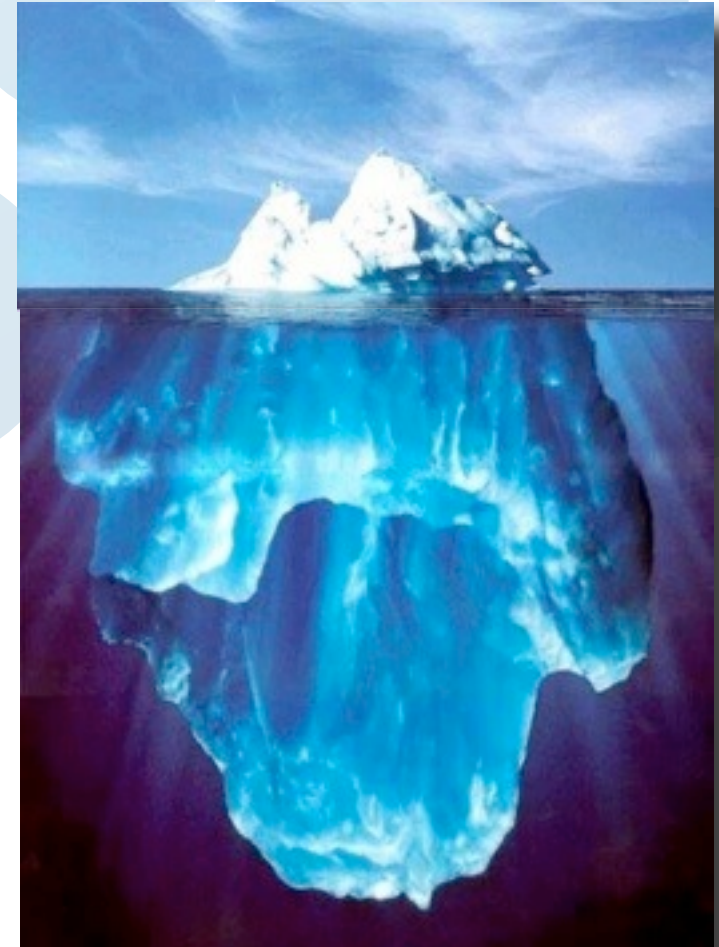
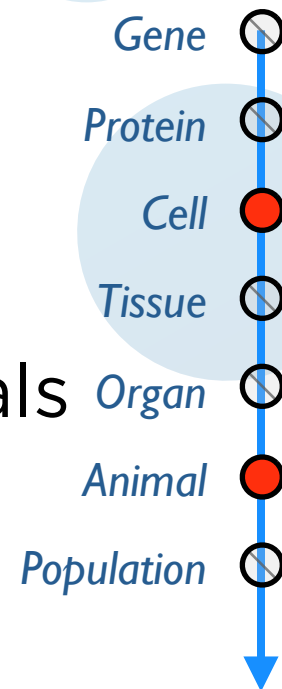
Cellvizio® approach for the CNS : bridging the scales

Anesthetized animals

- Networking via Ca^{2+} imaging
- Cell fate
- Some (limited) brain activities

Awake or Freely Moving animals

- Learning / Memory
- Autism
- Schizophrenia
- Addiction
- Other behavioral studies...



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in vivo fibered confocal microscopy for small animal research

See what Matters. Now



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