Johns Hopkins Engineering

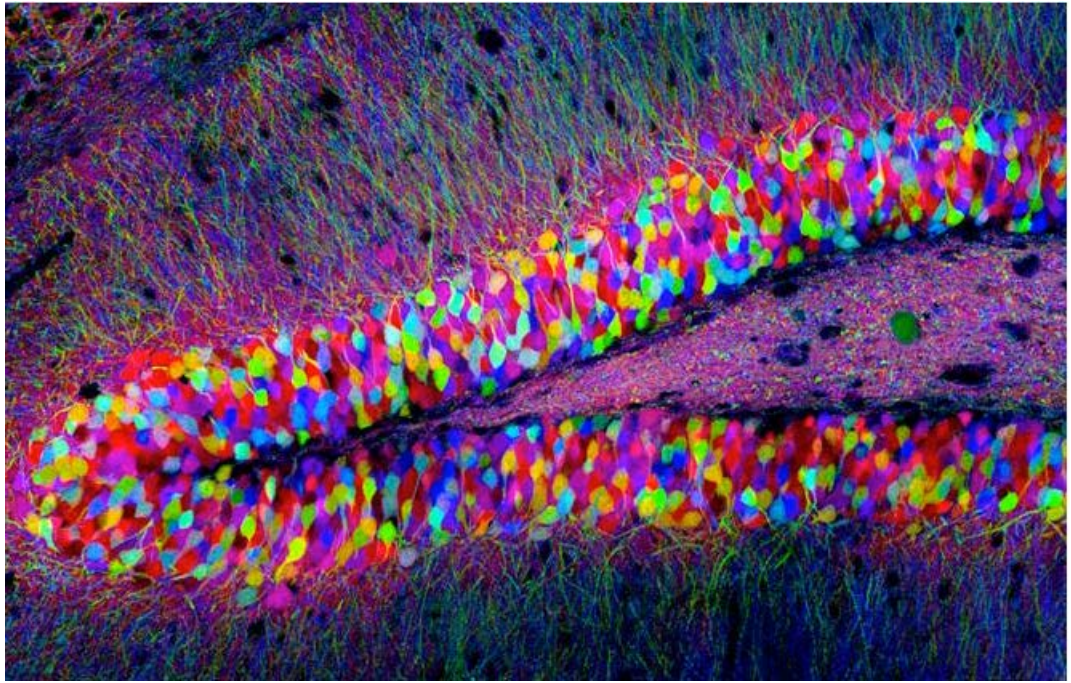
Methods in Neurobiology

BrainBOW

JOHNS HOPKINS
WHITING SCHOOL
of ENGINEERING

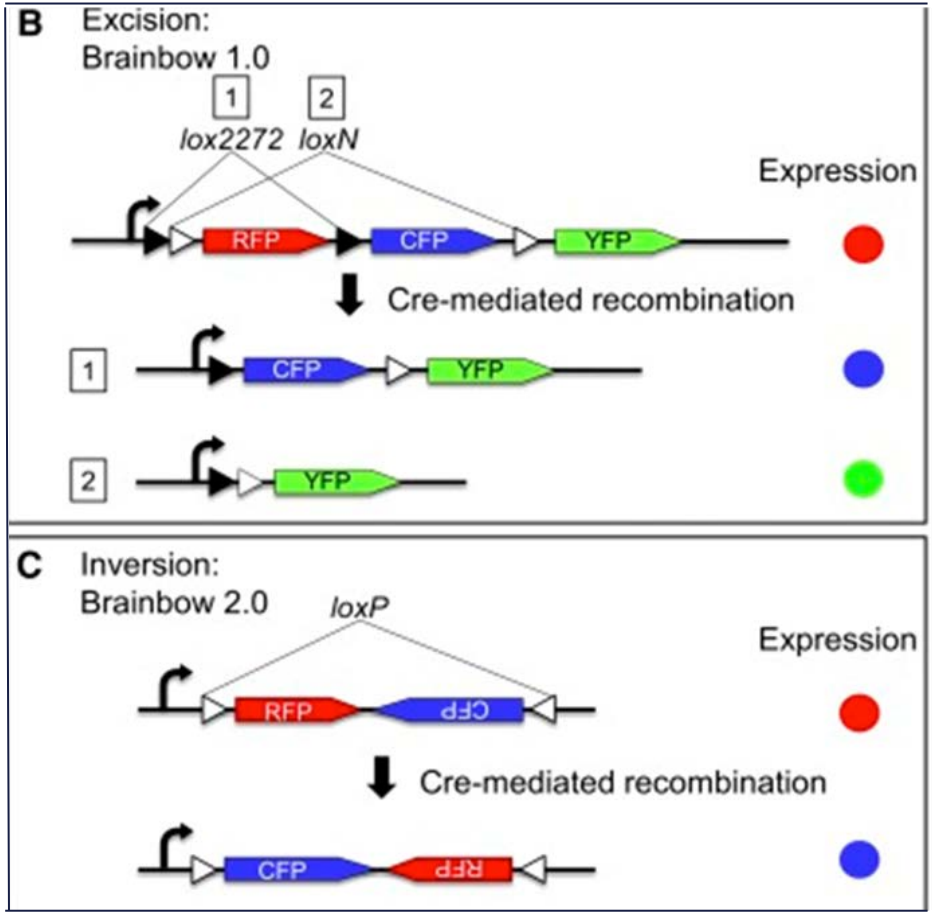
BrainBow

A genetic labeling technique that uses stochastic DNA recombination to distinguish one individual cells among others.



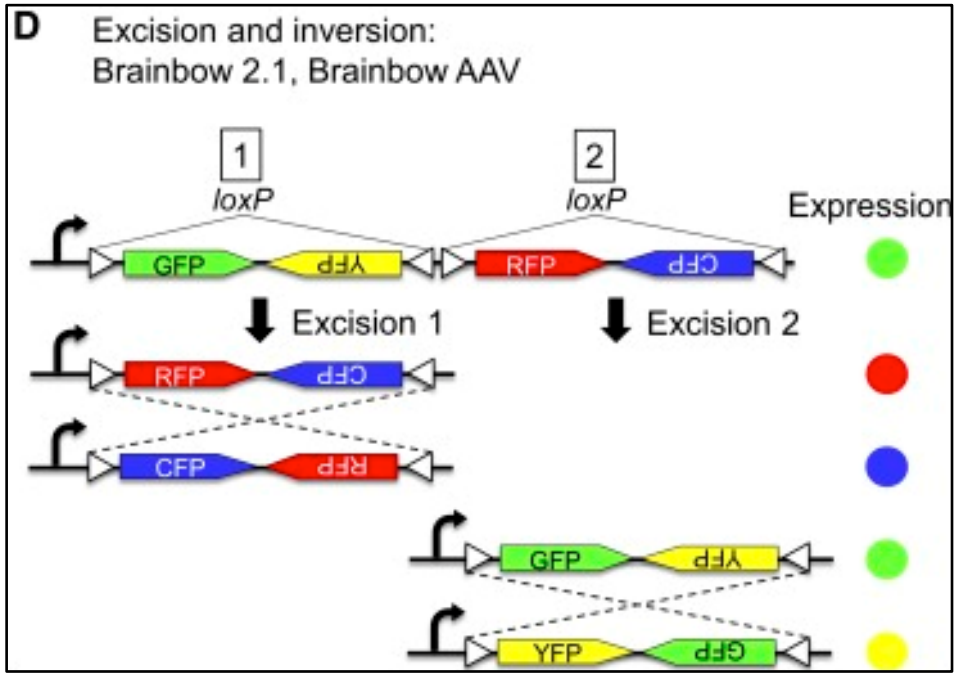
The BrainBow Cassette

(BrainBow 1.0)

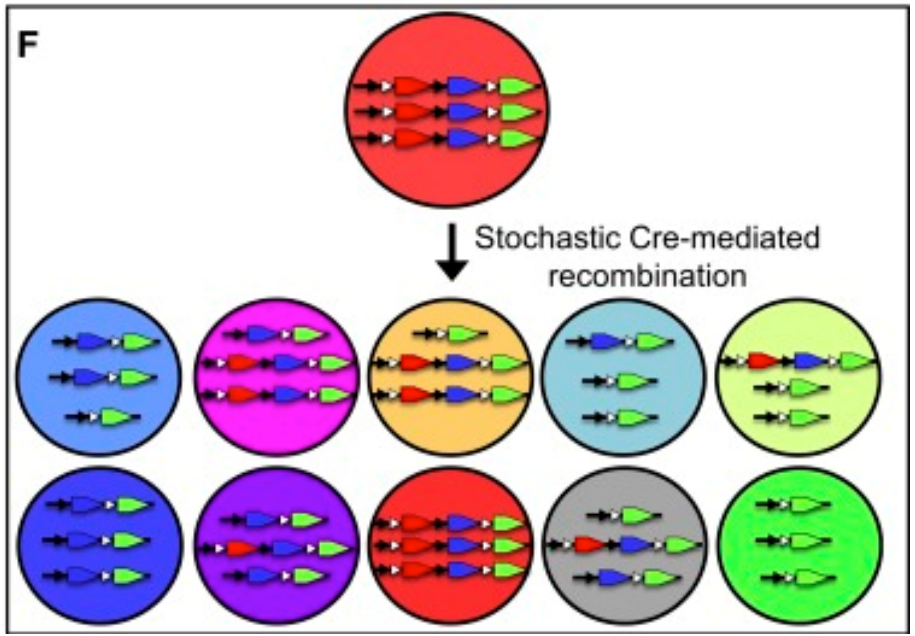


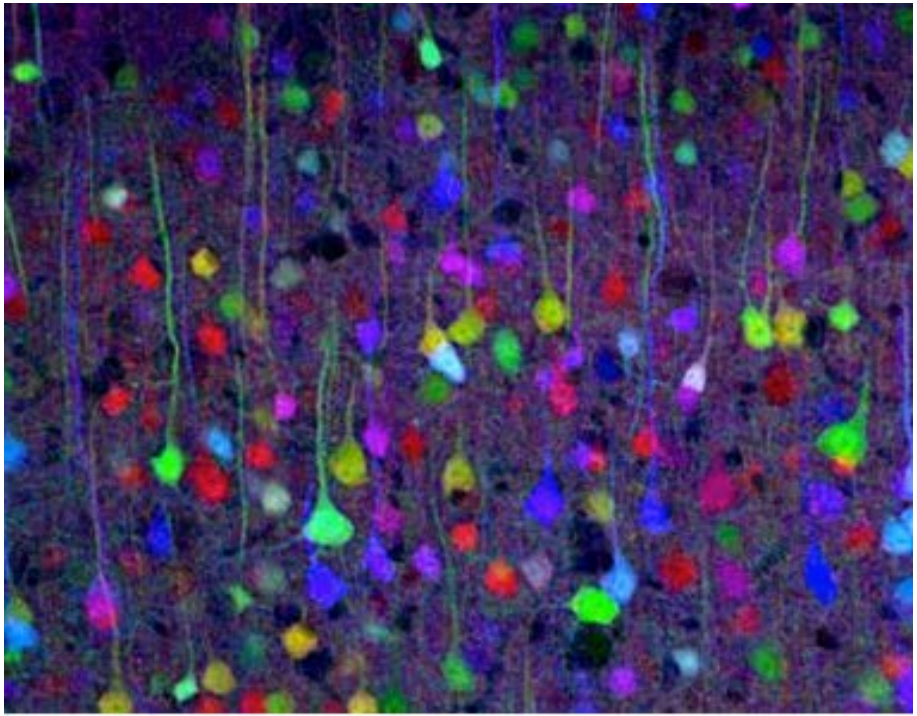
The BrainBow Cassette

(BrainBow 2.0)



Expression of Multiple BrainBow Cassettes

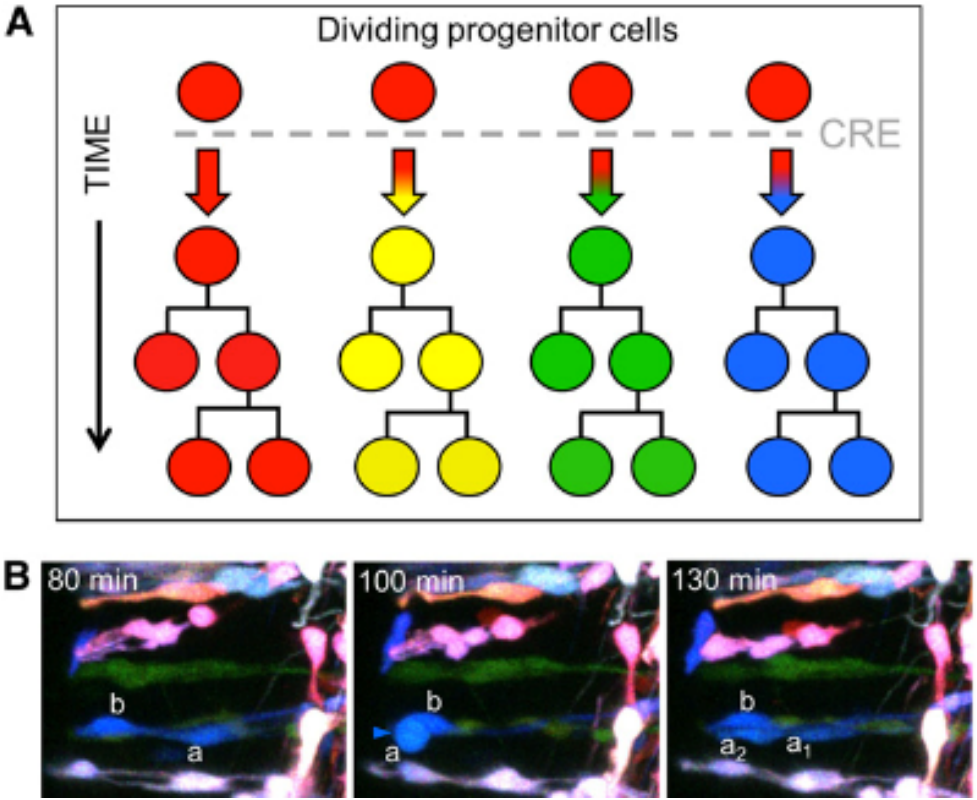




BrainBow Organisms

Organism	Latin name	Promoter	Transgenic lines
Mouse	*Mus musculus*	Neuronal	Brainbow 1.0/1.1/2.0/2.1 (Livet *et al.* 2007), Brainbow 3.0/3.1[a]/3.2[a], Flpbow 1/3[a], Autobow[b] (Cai *et al.* 2013)
		Ubiquitous	R26-Confetti[b] (Snippert *et al.* 2010)
			R26-Rainbow (Rinkevich *et al.* 2011)
			Rainbow (Tabansky *et al.* 2013)
			MAGIC[c] (Loulier *et al.* 2014)
			Ubow (Ghigo *et al.* 2013)
Zebrafish	*Danio rerio*	Gal4 inducible	Brainbow (Robles *et al.* 2013)
			Zebrabow (Pan *et al.* 2013)
		Ubiquitous	PriZm (Gupta and Poss 2012)
			Zebrabow (Pan *et al.* 2013)
Fruit fly	*Drosophila melanogaster*	Gal4 inducible	dBrainbow[b] (Hampel *et al.* 2011)
			Flybow1.0/1.1/2.0[a] (Hadjieconomou *et al.* 2011)
			LOLLibow (Boulina *et al.* 2013)
		Ubiquitous	TIE-DYE[b] (Worley *et al.* 2013)
Plant	*Arabidopsis thaliana*	Ubiquitous	Brother of Brainbow (Wachsman *et al.* 2011)

Labeling Progenitor Cells Over time



References

Slide	Reference
2-7	Livet J., Weissman T. A., Kang H., Draft R. W., Lu J., et al. , 2007. Transgenic strategies for combinatorial expression of fluorescent proteins in the nervous system. Nature 450: 56–62. Weissman TA, Pan YA. 2015 Brainbow: new resources and emerging biological applications for multicolor genetic labeling and analysis. Genetics 199(2):293-306.