KING'S College LONDON

INSTITUTE OF PSYCHIATRY,
PSYCHOLOGY & NEUROSCIENCE

Module:
Biological foundations of mental health

Week 2:
Building blocks of the brain

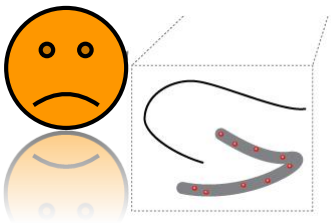
Dr Sandrine Thuret

Topic 2
From embryonic neural progenitor cells to adult hippocampal neurogenesis

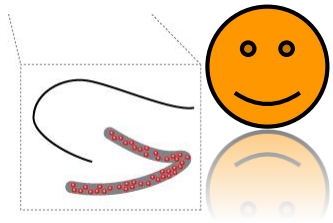
Part 4 of 4

Modulation of Adult Neurogenesis

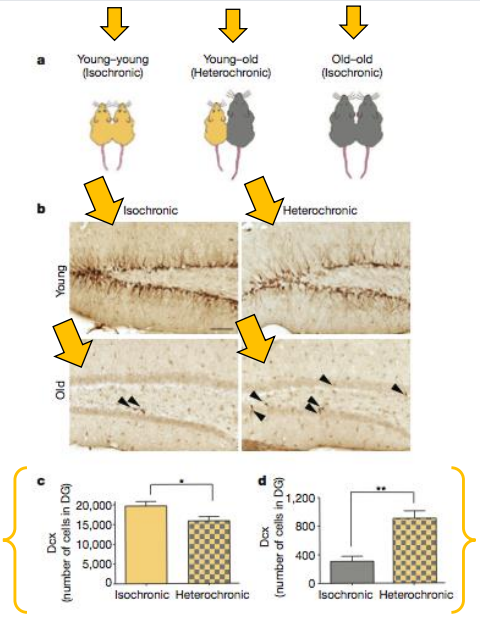
Modulation of Adult Hippocampal Neurogenesis



Do these behaviours increase or decrease adult hippocampal neurogenesis?



Ageing influences adult hippocampal neurogenesis



Villeda et al., 2011

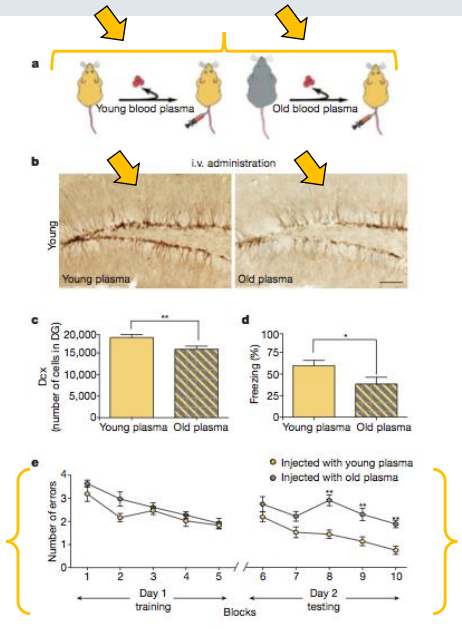


Figure 16: Plasma experiment

Adult Hippocampal Neurogenesis emerging as Target of choice?

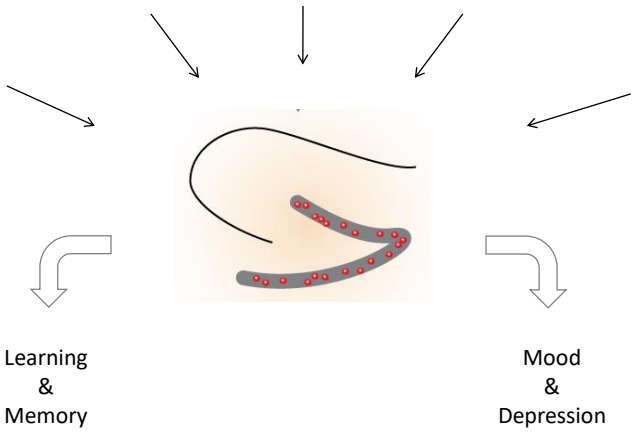


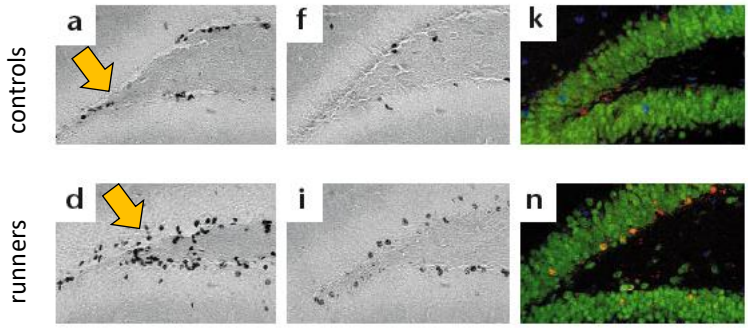
Figure 17: Target of choice?

Modulation of adult neurogenesis (1)

Figure 18: Modulation of adult neurogenesis

Van Praag, H., G. Kempermann, and F. H. Gage. "Running Increases Cell Proliferation and Neurogenesis in the Adult Mouse Dentate Gyrus." *Nature Neuroscience* 2, no. 3 (March 1999)

Modulation of adult neurogenesis (2)



	Control	Runner
Proliferation, 1 day	4393 (607)	6773 (971)***
Survival, 4 weeks	1880 (251)	3791 (715)**
Survival (%), 4 weeks	43 (5.7)	56 (10.6)
Phenotypes:		
Neuron (%)	76.8 (3.2)	88.3 (1)*
Astrocyte (%)	7 (2.1)	3.3 (0.6)
Other (%)	16.3 (1.7)	9 (1.3)*
Volume (mm^3)	0.43 (0.02)	0.42 (0.02)

Figure 19: Modulation of adult neurogenesis

In summary

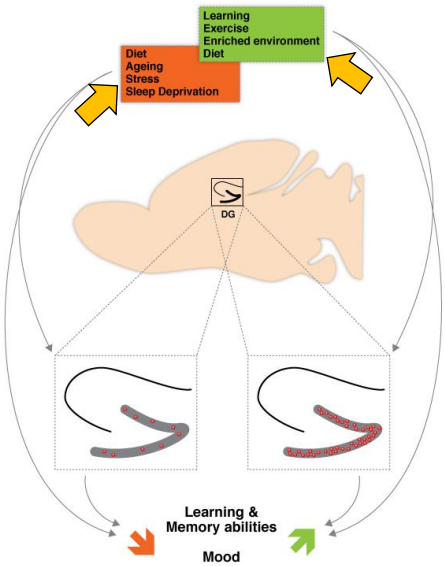


Figure 20: To summarise ...

Modulation of Adult Hippocampal Neurogenesis by Diet

Figure 21: Modulation of Adult Hippocampal Neurogenesis by Diet

Neurogenesis is related to diet

Figure 22: 'Neurogenesis and food' by Stangl and Thuret, 2009

Diet, cognition and mood

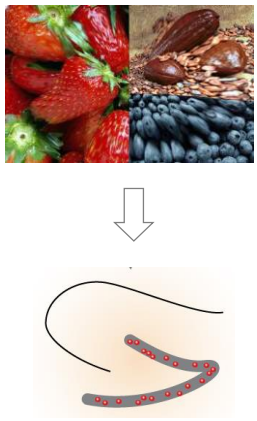


Figure 23 Diet, cognition and mood

Image references

1. Fig 2 & 3: Kirsty L. Spalding et al, "Dynamics of Hippocampal Neurogenesis in Adult Humans", *Cell*, Vol. 153, Issue 6, p1219–1227, 6 June 2013

2. Fig 9: Song, Hongjun, Charles F. Stevens, and Fred H. Gage. "Astroglia Induce Neurogenesis from Adult Neural Stem Cells." *Nature* 417, no. 6884 (May 2, 2002): 39–44.

3. Fig 11: Mu, Yangling, Star W Lee, and Fred H Gage. "Signaling in Adult Neurogenesis." *Current Opinion in Neurobiology* 20, no. 4 (August 2010): 416–23.

4. Fig 12 & 13: Lie, Dieter-Chichung, Sophia A. Colamarino, Hong-Jun Song, Laurent Désiré, Helena Mira, Antonella Consiglio, Edward S. Lein, et al. "Wnt Signalling Regulates Adult Hippocampal Neurogenesis." *Nature* 437, no. 7063 (October 27, 2005): 1370–75.

5. Fig 16: Villeda, Saul A., Jian Luo, Kira I. Mosher, Bende Zou, Markus Britschgi, Gregor Bieri, Trisha M. Stan, et al. "The Ageing Systemic Milieu Negatively Regulates Neurogenesis and Cognitive Function." *Nature* 477, no. 7362 (September 1, 2011): 90–94.

6. Fig 18 & 19: Van Praag, H., G. Kempermann, and F. H. Gage. "Running Increases Cell Proliferation and Neurogenesis in the Adult Mouse Dentate Gyrus." *Nature Neuroscience* 2, no. 3 (March 1999)