

Biology of Mental Illness & Treatment



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Biology of Mental Illness & Treatment



- Deepen knowledge of relevant bio-psychological concepts
- Expand repertoire (of language, metaphors, diagrams) for discussions of biology with patients
- Develop useful habits for consumption of biological psychiatry research literature
- Dispel myths & assumptions about the biology of mental illness

Discussion! We want to hear from you!





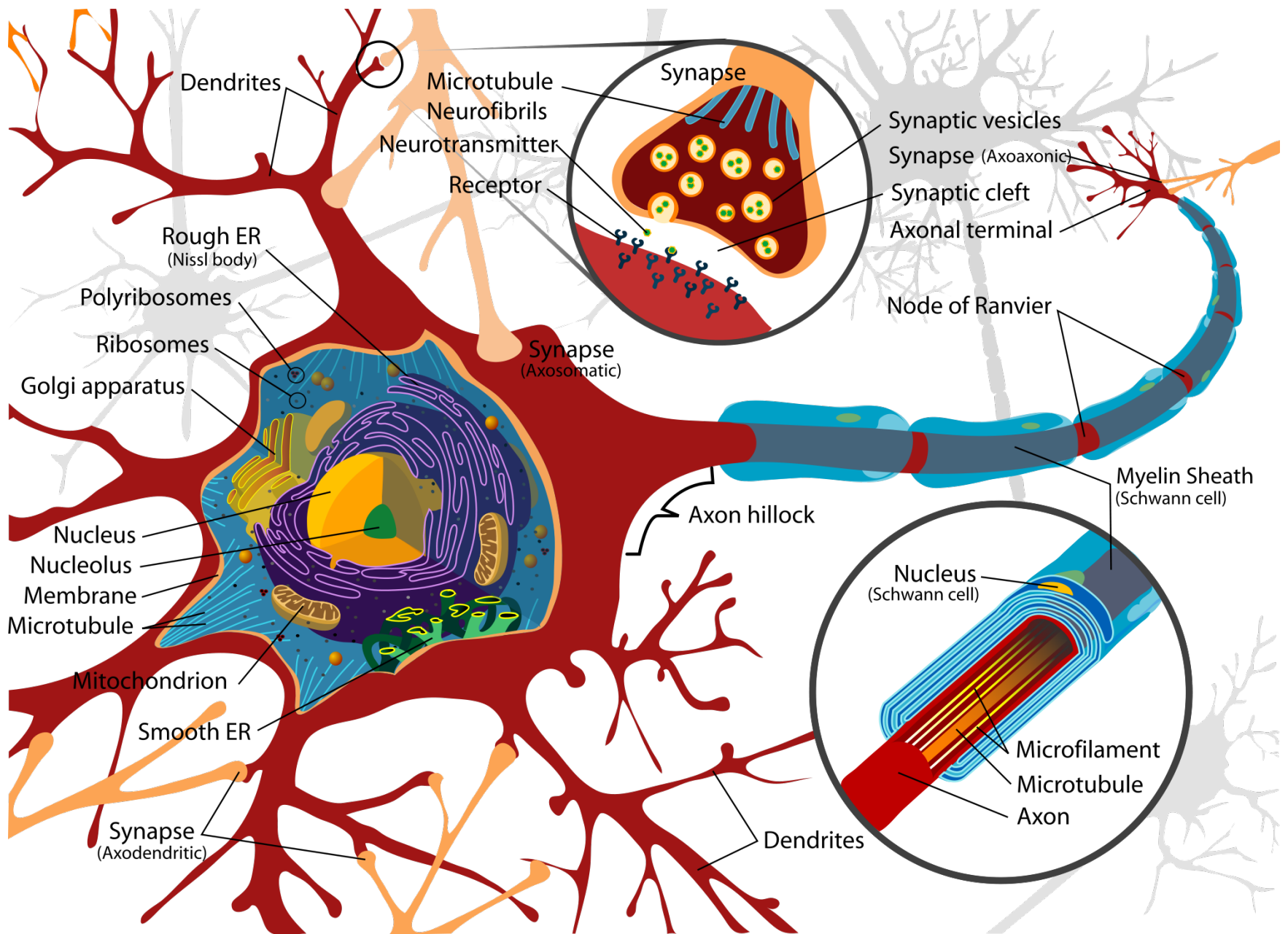
- The so-called “Nature vs. Nurture Debate” is now moot
- We now understand mechanisms through which our experiences create lasting biological changes



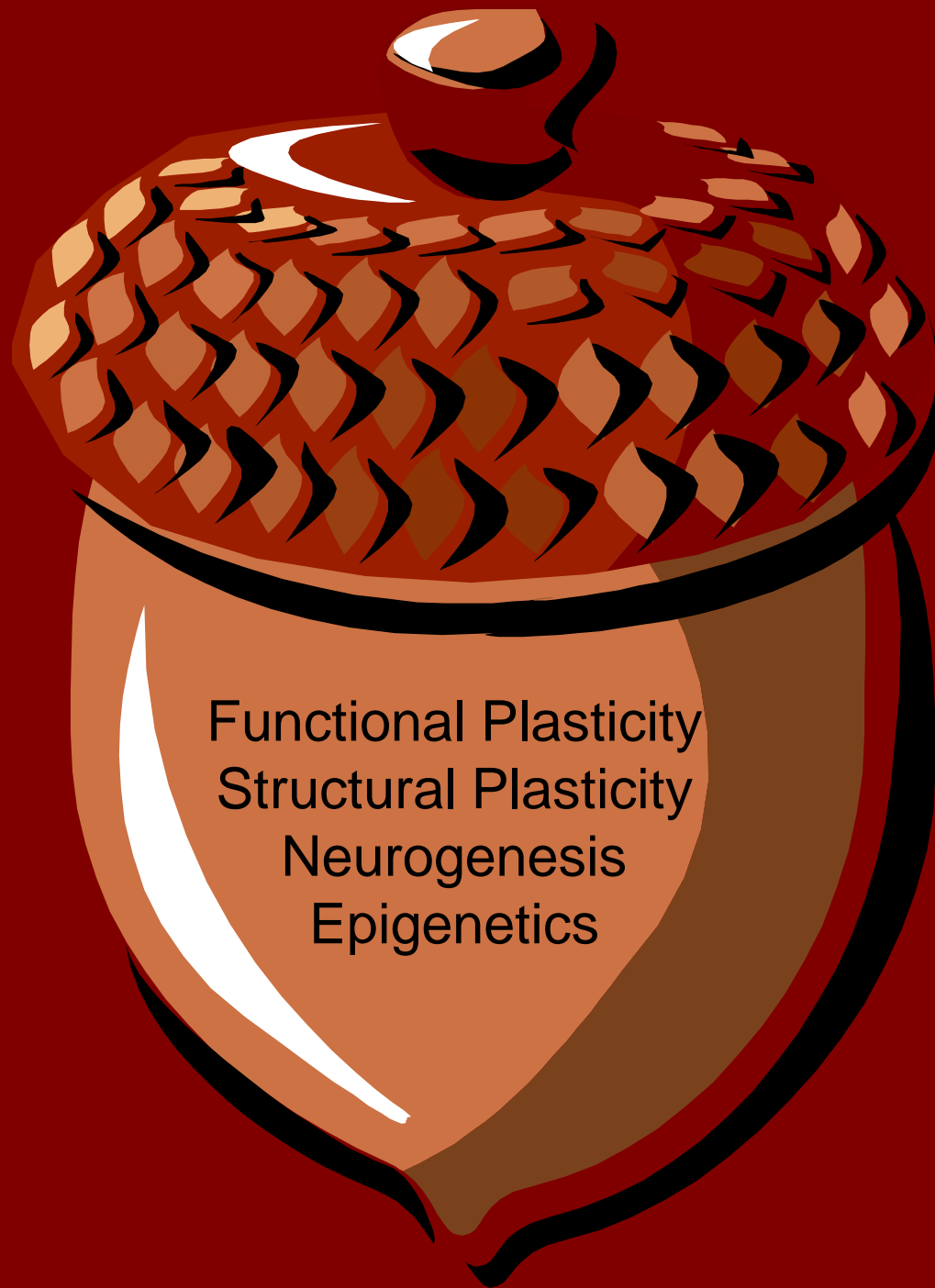
Neuroplasticity: What is it?

- Functional & structural adaptations to the environment (Citri & Malenka, 2008)
- Experience-dependent changes in brain function & structure, related to:
 - Learning and acquiring new information
 - Adaptive behavioral choices
 - Practice & repetition of new behaviors

(Pittenger & Duman, 2008; Kasper & McEwen, 2008; Tononi & Cirelli, 2006)
- Activity-dependent: “Cells that fire together wire together” (referred to as Hebb’s law)



From: http://en.wikipedia.org/wiki/Activity-dependent_plasticity



Functional Plasticity
Structural Plasticity
Neurogenesis
Epigenetics

Neuroplasticity

- Neurogenesis (mainly in dentate gyrus of hippocampus)
 - Proliferation and survival of newborn neurons
 - Migration into neural circuits sculpted by experience
- Experience-induced epigenetic marks
 - Long-term changes in gene expression without changing the DNA

Myth: If the disorder is biologically-based, then
it must be treated medically (and
psychological treatments are irrelevant)

Alternative: Synergism between medical &
psychological treatments

“The pharmacological effects of antidepressants need to
be combined with psychological rehabilitation to
reorganize networks rendered more plastic by the drug
treatment.”

Karpova et al. (2011) *Science*.

“The joint use of pharmacological and psychotherapeutic interventions might be especially successful because of a potentially interactive and synergistic—not only additive—effect of the two interventions.

Psychopharmacological treatment may help consolidate the biological changes caused by psychotherapy.”

Eric R. Kandel, M.D., 1998

Summary

- Early life experiences can cause lasting changes in neural circuits & gene expression
- Experiences in adulthood can cause lasting changes in neural circuits & gene expression
- Behavioral sculpting of new circuits requires practice & repetition
- Synergism between medical & behavioral treatment