

Human Adult Neurogenesis Debate Round 2

Naoki Hiratani
Gatsby Tea Talk

Ref:

WTF! No neurogenesis in humans?? - Jason Snyder's Blog

Questioning human neurogenesis - Jason Snyder, Nature, 2018

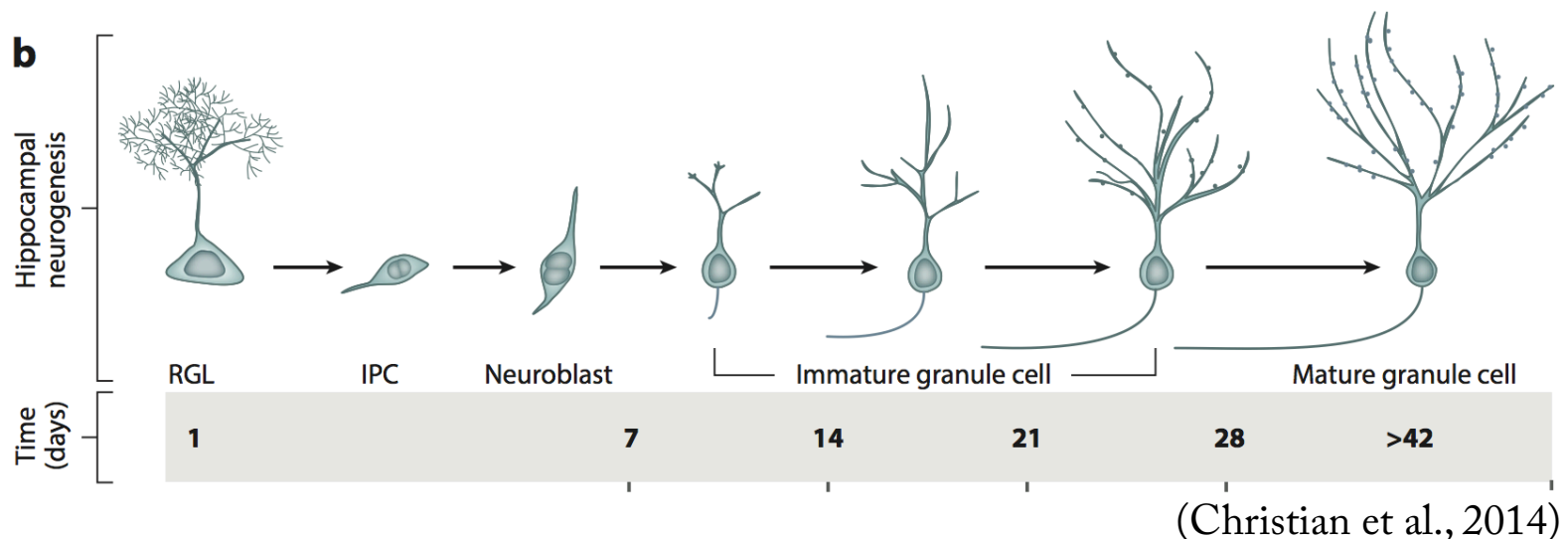
What is adult neurogenesis?

Most neurons are generated at prenatal or early postnatal stages, and last for lifetime unlike typical body cells.

In some regions of some species, new neurons are continuously added even in the adult brain.

In rodents, adult neurogenesis is reported at dentate gyrus and olfactory bulb.

Adult neurogenesis is arguably a sample-based learning mechanism for dealing with high-dimensional inputs.



Does adult neurogenesis happen in human?

-1960: No!

1960-1980: According to Joseph Altman, Yes; but everybody else said No

1980-1990: Maybe in rats, but definitely not in macaque nor human

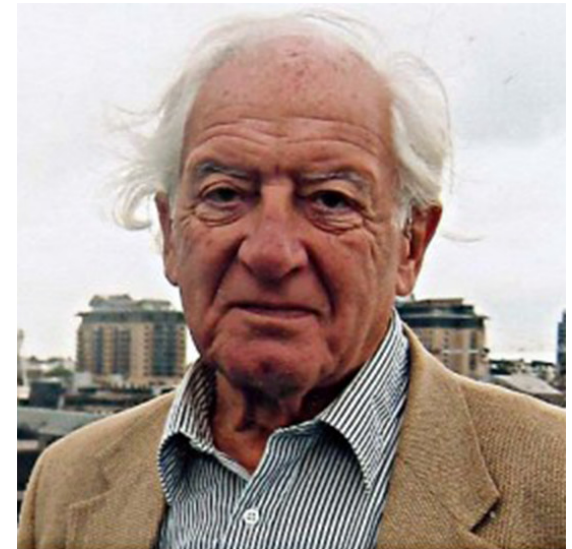
1990-2005: Definitely in rats olfactory bulb and dentate gyrus,
maybe in primate too

2005-2017: Yes, even in human olfactory bulb and
dentate gyrus

2018: No. Wait WTF! Did you say no?

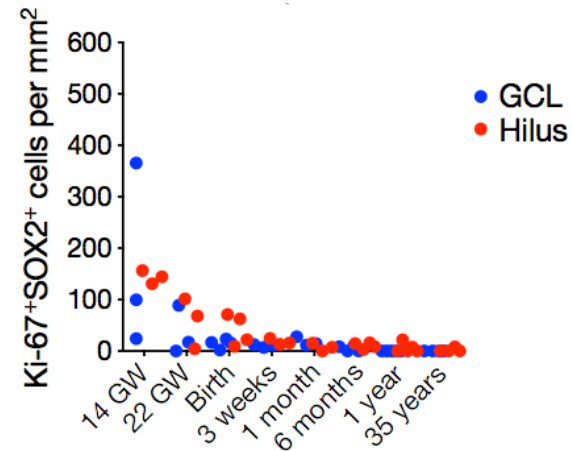
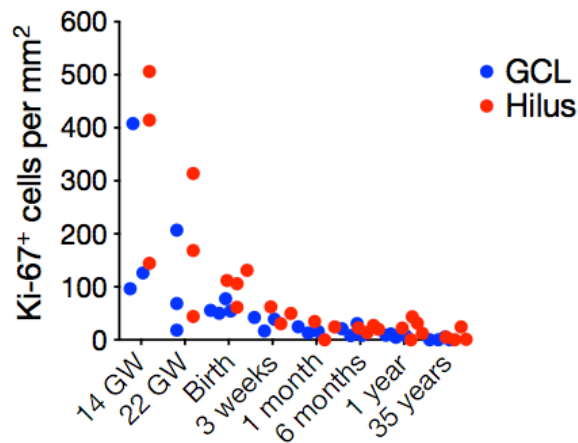
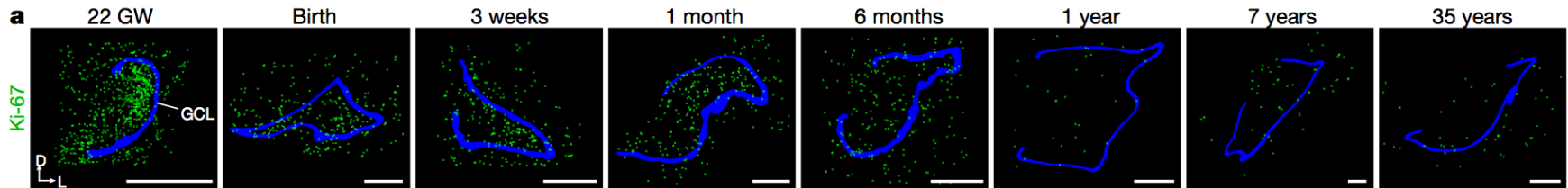
↑
Round 1
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Round 2?



Joseph Altman (1925-2016)

Sorrells et al., 2018



No sign of neurogenesis for tissues older than 13 years-old, despite

- Excellent histology
- Good control
- More stringent criteria than common studies

Is there enough evidence against human adult neurogenesis?

There are several papers reached the same conclusion (Sanai et al., 2011; Dennis et al., 2016).

No sign of adult neurogenesis in some of large mammals (eg. dolphins)

Even in rodents, most results are from young adult (~8 weeks old)

Why is it a controversial topic?

Technical issue: No unique marker for neurogenesis

Ethical issue: Most people die old

Social issue: Big-pharma...

Why should you care?

Rodent centralism:

The way human brain works may be quite different from rodent's brain.

SSRI:

A major hypothesis claims that anti-depressants work through enhancing adult neurogenesis

More is different:

Rat DG: 1.2×10^6 neurons, Human DG: 1.8×10^7 neurons

Human DG is relatively small, considering 100 times difference in the total number of neurons in the hippocampus

Human neurogenesis lasts at least for 10 years, which is longer than rodent's lifespan

