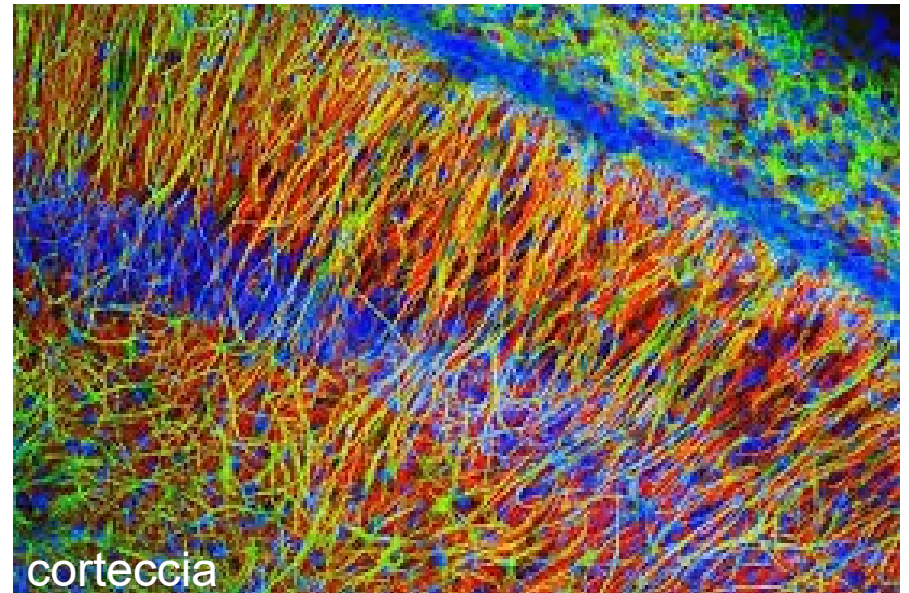
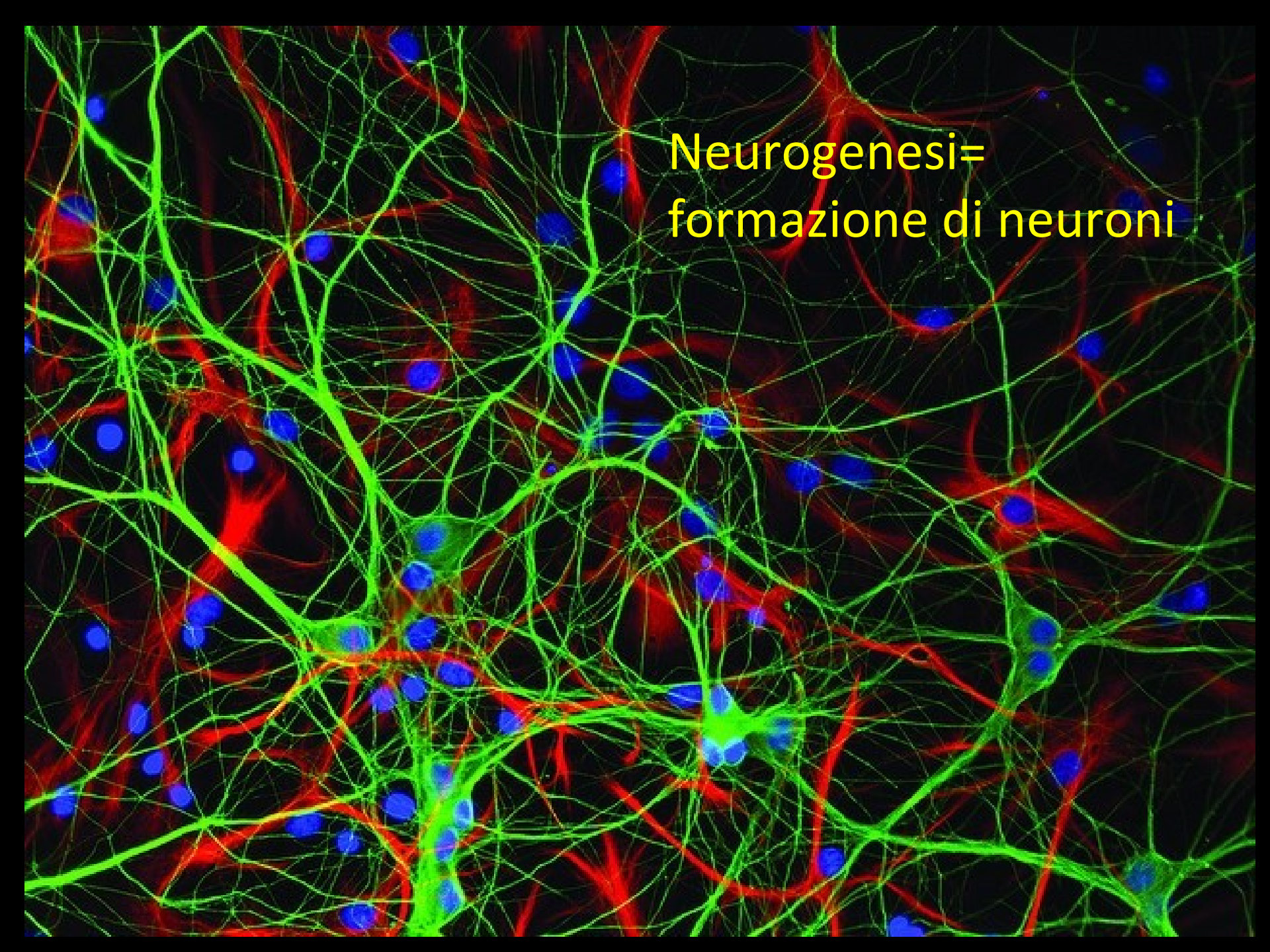


La complessità del cervello umano

100 miliardi Neuroni (10^{11})

10^6 miliardi Sinapsi (10^{15})



A fluorescence micrograph showing a dense network of neurons. The neurons are stained with three different colors: green, red, and blue. The green staining highlights the cell bodies and their extensive dendritic and axonal processes, which form a complex web. The red staining appears to be localized to specific structures, possibly axons or certain types of neurons. The blue staining marks the nuclei of the neurons, providing a clear view of their distribution and density. The overall image is set against a dark background, making the brightly colored structures stand out.

Neurogenesi=
formazione di neuroni

La neurogenesi adulta

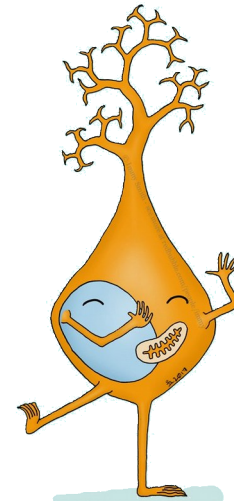
“La produzione di **nuovi** neuroni nel cervello **adulto**”



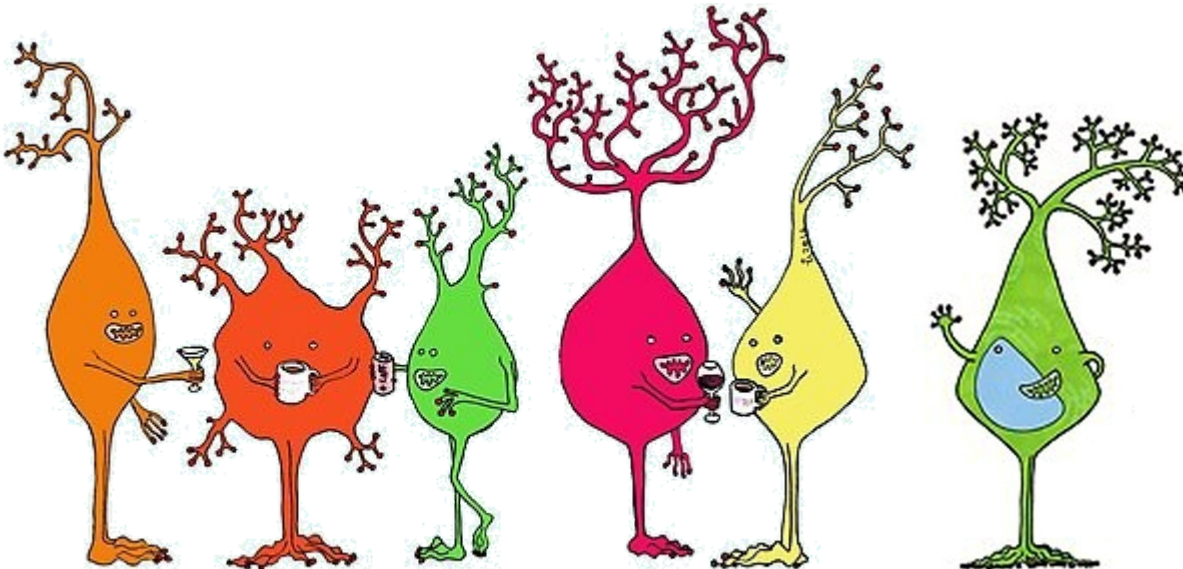
cellula
staminale



progenitore

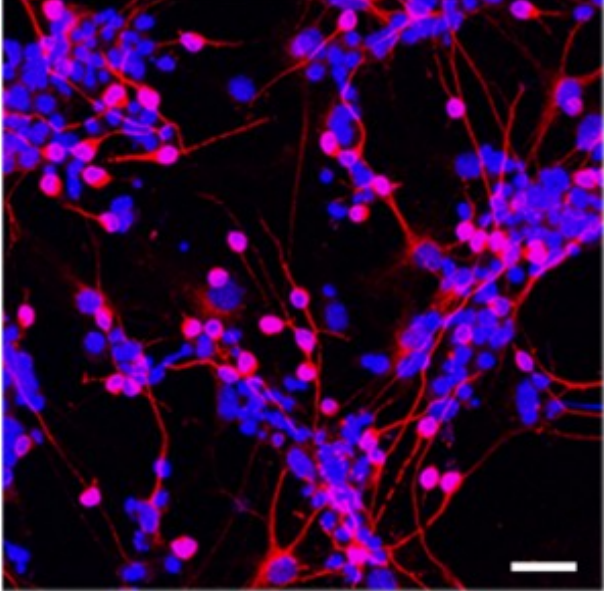
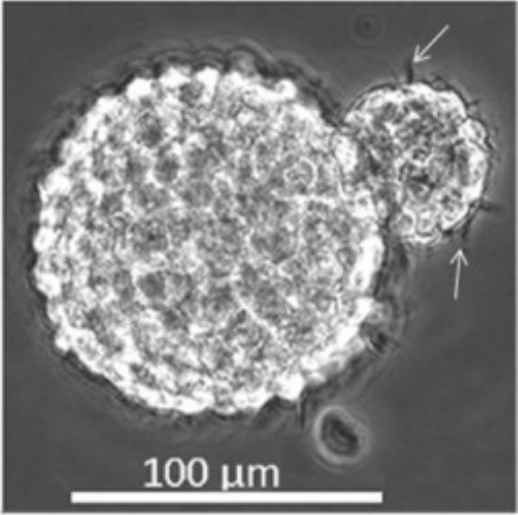


Neurone immaturo

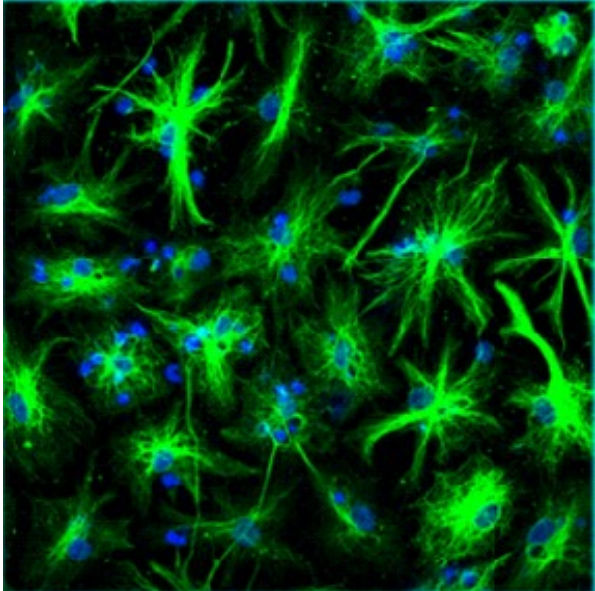


Circuito neuronale
(la squadra!)

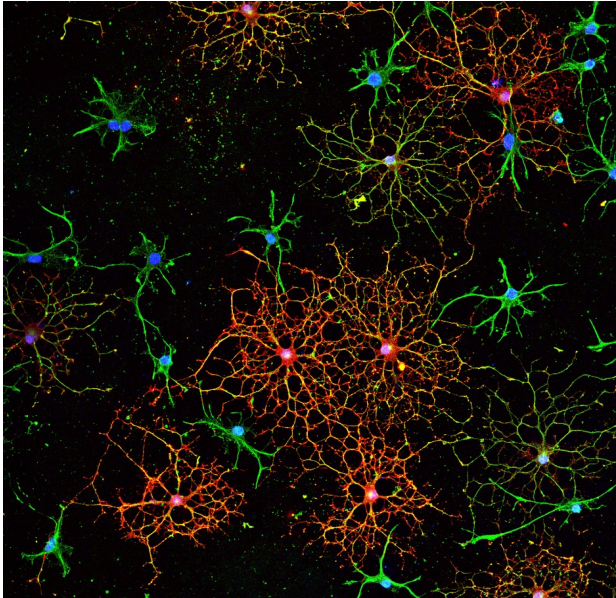
Cellule
neurostaminali



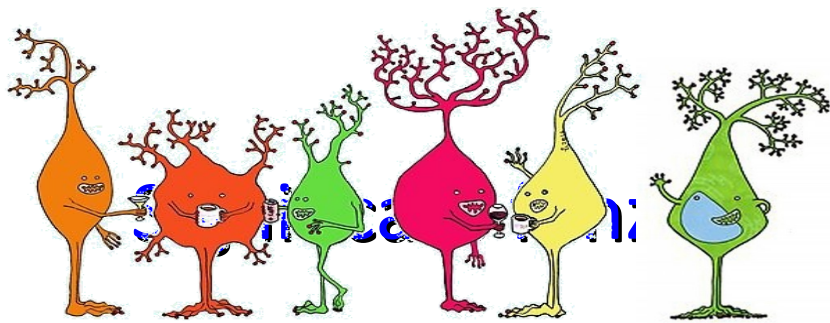
Neuroni



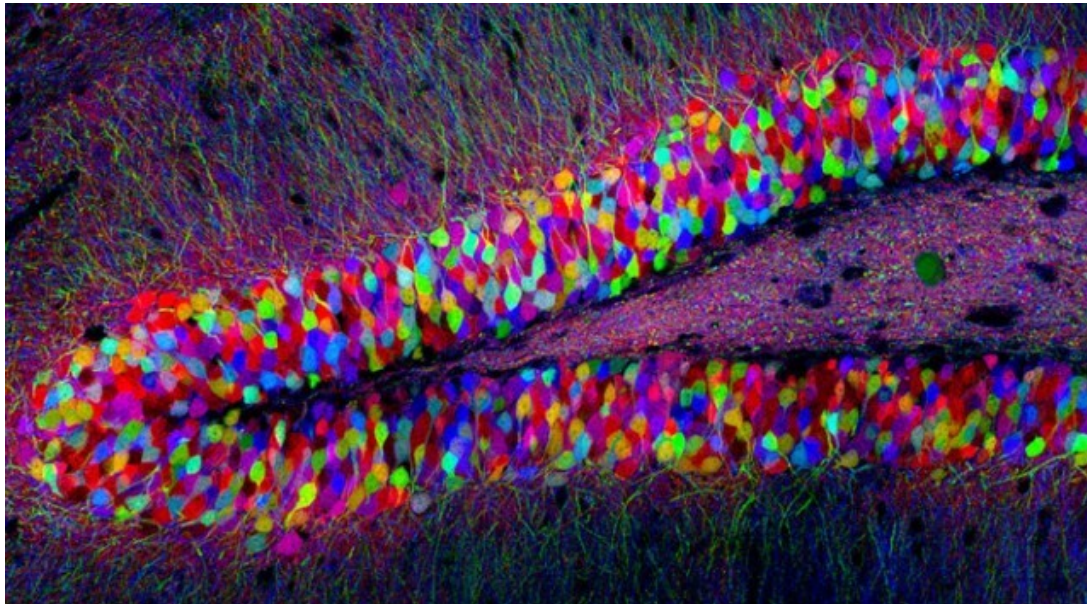
Astrociti



Oligodendrociti



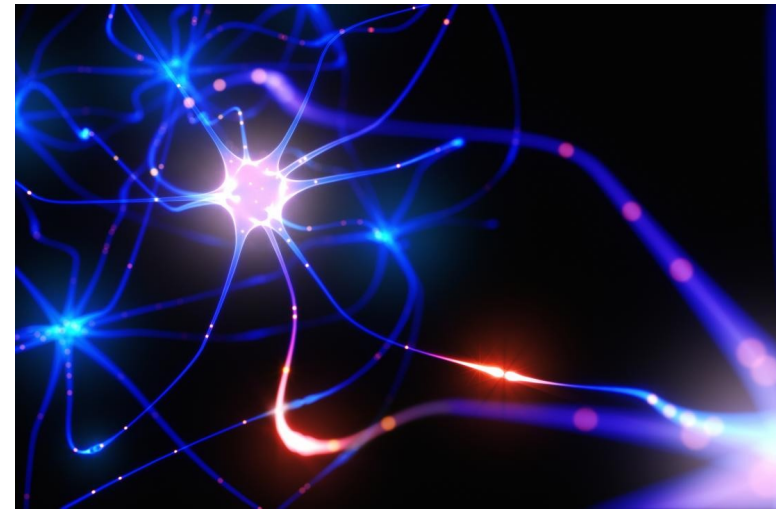
e della neurogenesi adulta:



In condizioni **FISIOLOGICHE**, la NA svolge un ruolo importante nel preservare le normali funzioni ippocampali, quali l'apprendimento e la memoria

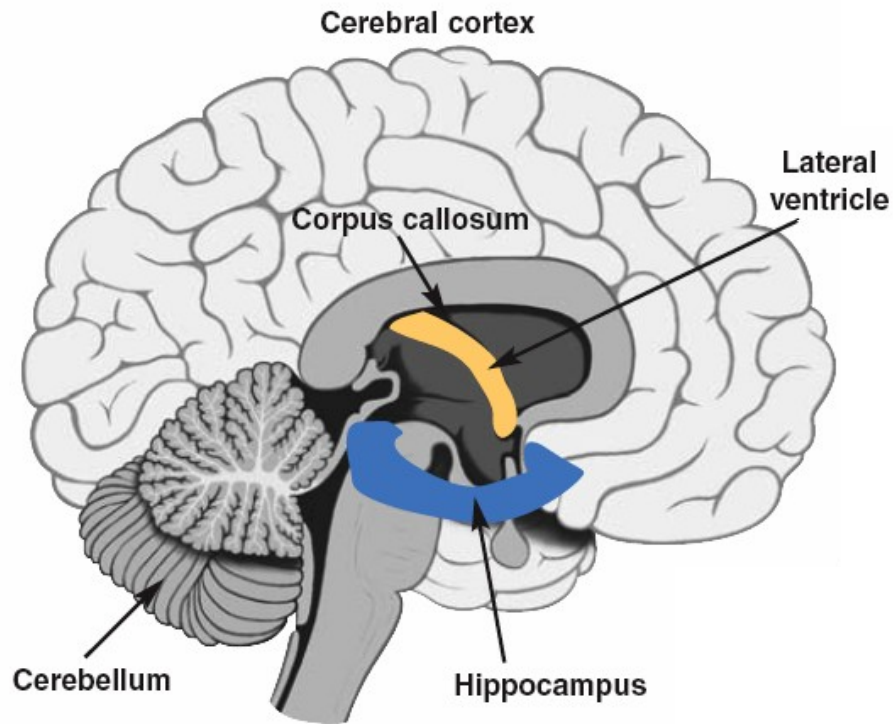


E' possibile utilizzare la neurogenesi adulta per
“potenziare” o “riparare” il cervello?

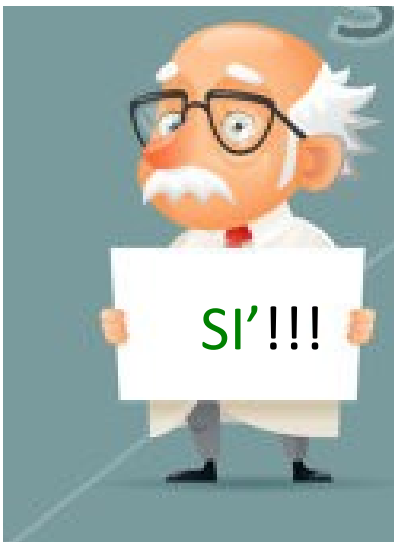


- **“Quanta” neurogenesi adulta è presente nel cervello umano?**
- **E’ possibile stimolare la neurogenesi adulta nell’uomo?**

Nel cervello umano adulto ci sono cellule neurostaminali!



Human Brain



neurogenesi
adulta
nell'uomo

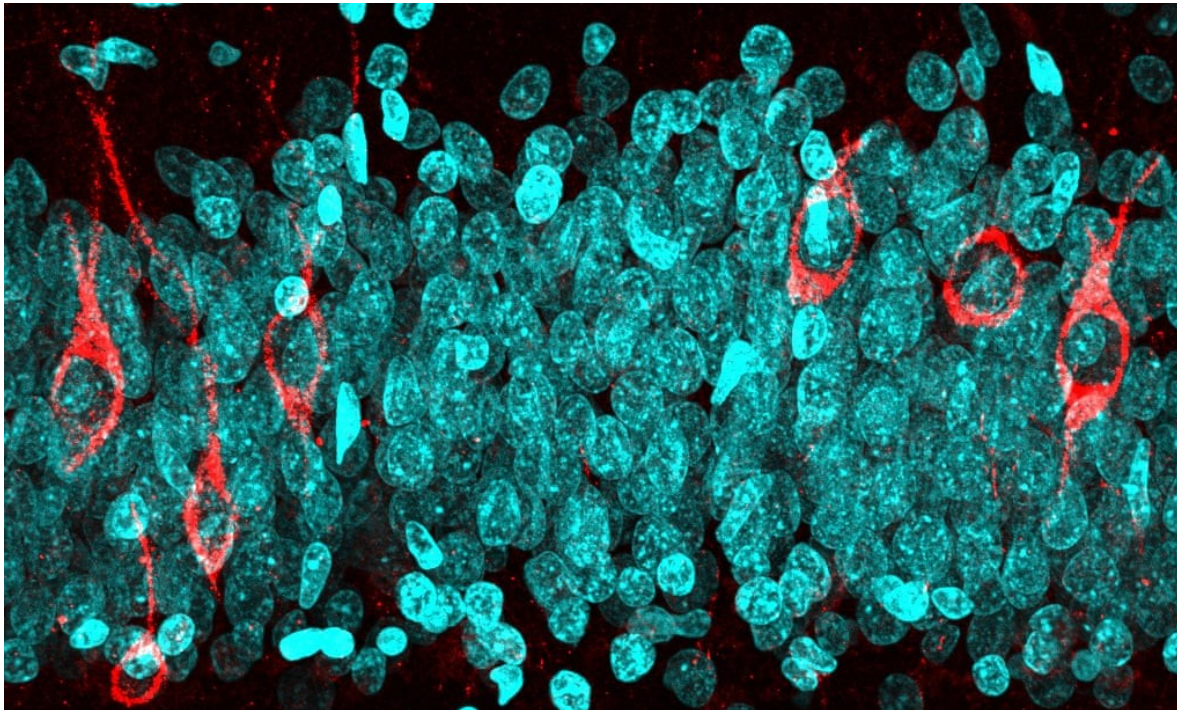
?



2018



“Gli esseri umani producono nuove cellule cerebrali per tutta la vita”

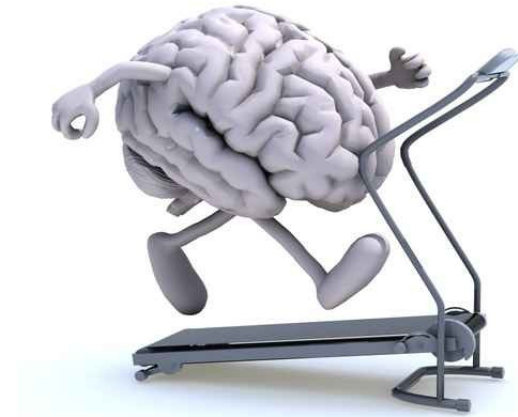


Neurogenesi adulta
in un cervello umano
(individuo di 68 anni)

(Boldrini, *Cell Stem Cell*, 2018)

Come indurre la neurogenesi adulta?

L'esercizio fisico
AEROBICO
aumenta la
neurogenesi!!!



running



swimming

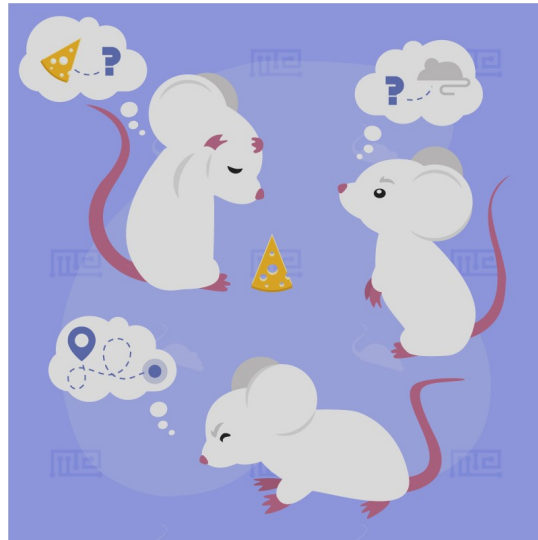


biking

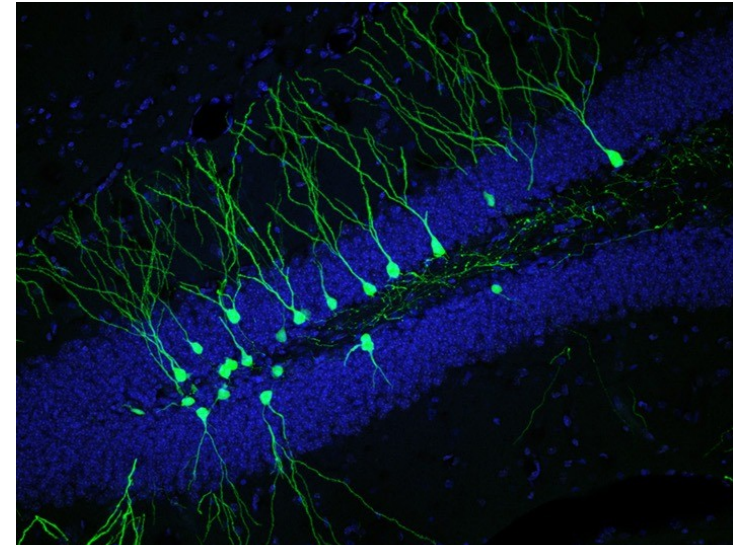
L'esercizio fisico migliora la memoria e l'apprendimento tramite l'aumento di neurogenesi adulta



training



test di memoria

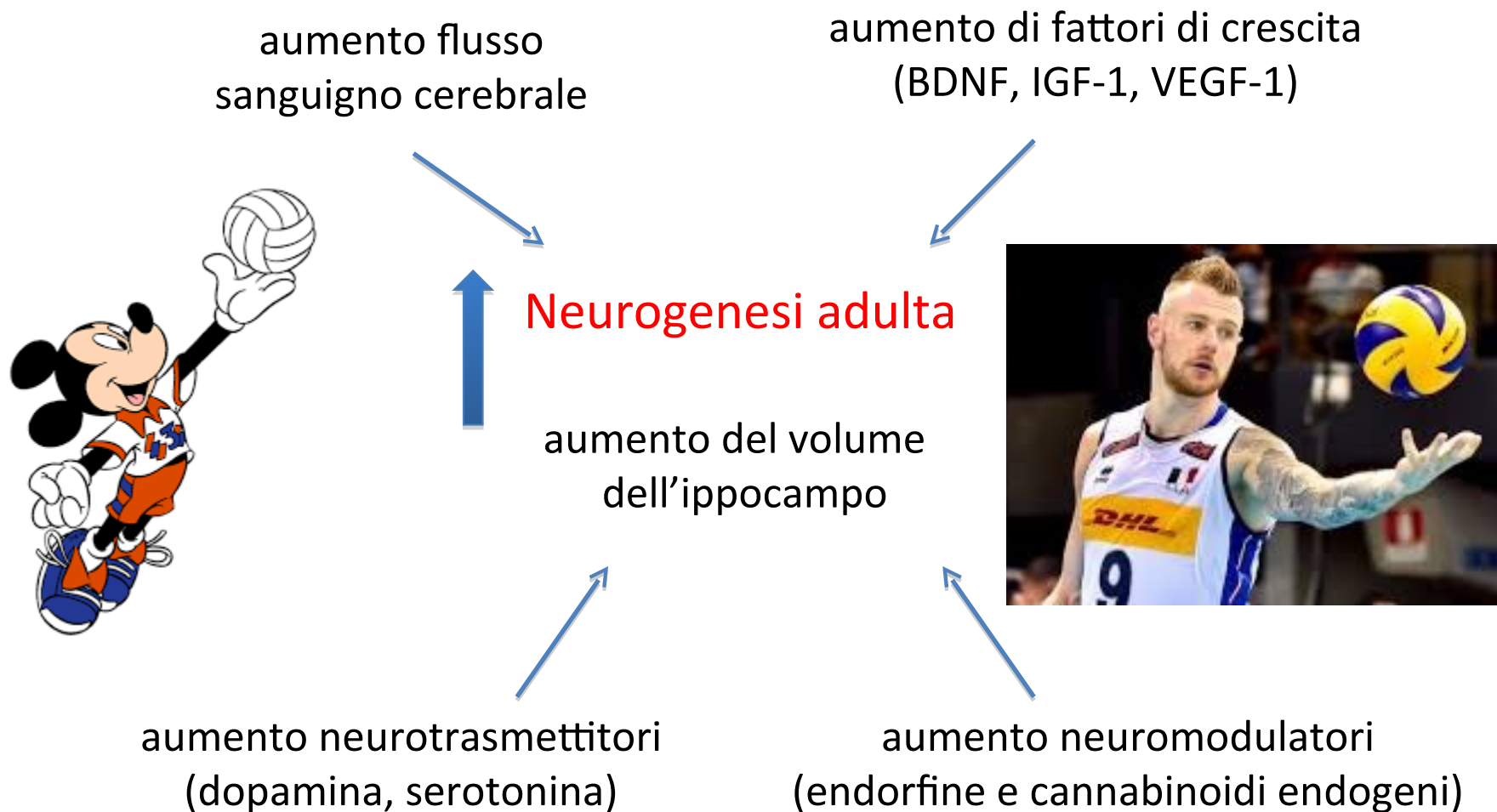


aumento di nuovi neuroni

E nell'uomo?

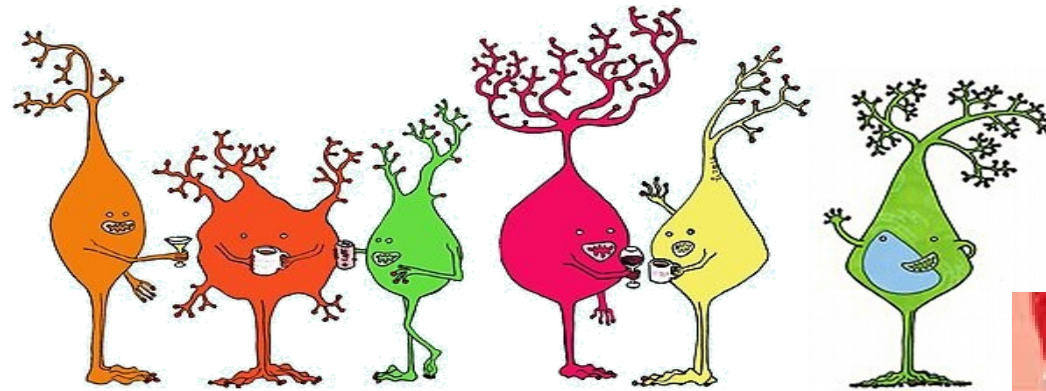


Gli effetti benefici dell'esercizio fisico sul cervello umano



La neurogenesi adulta come fonte di neuro-plasticità!

La plasticità cerebrale è un processo CONTINUO che permette un rimodellamento delle connessioni (sinapsi) tra neuroni





**“Dico ai giovani: non pensate a voi stessi, pensate agli altri.
Pensate al futuro che vi aspetta, pensate a quello che potete fare,
e non temete niente” (Rita Levi-Montalcini)**

