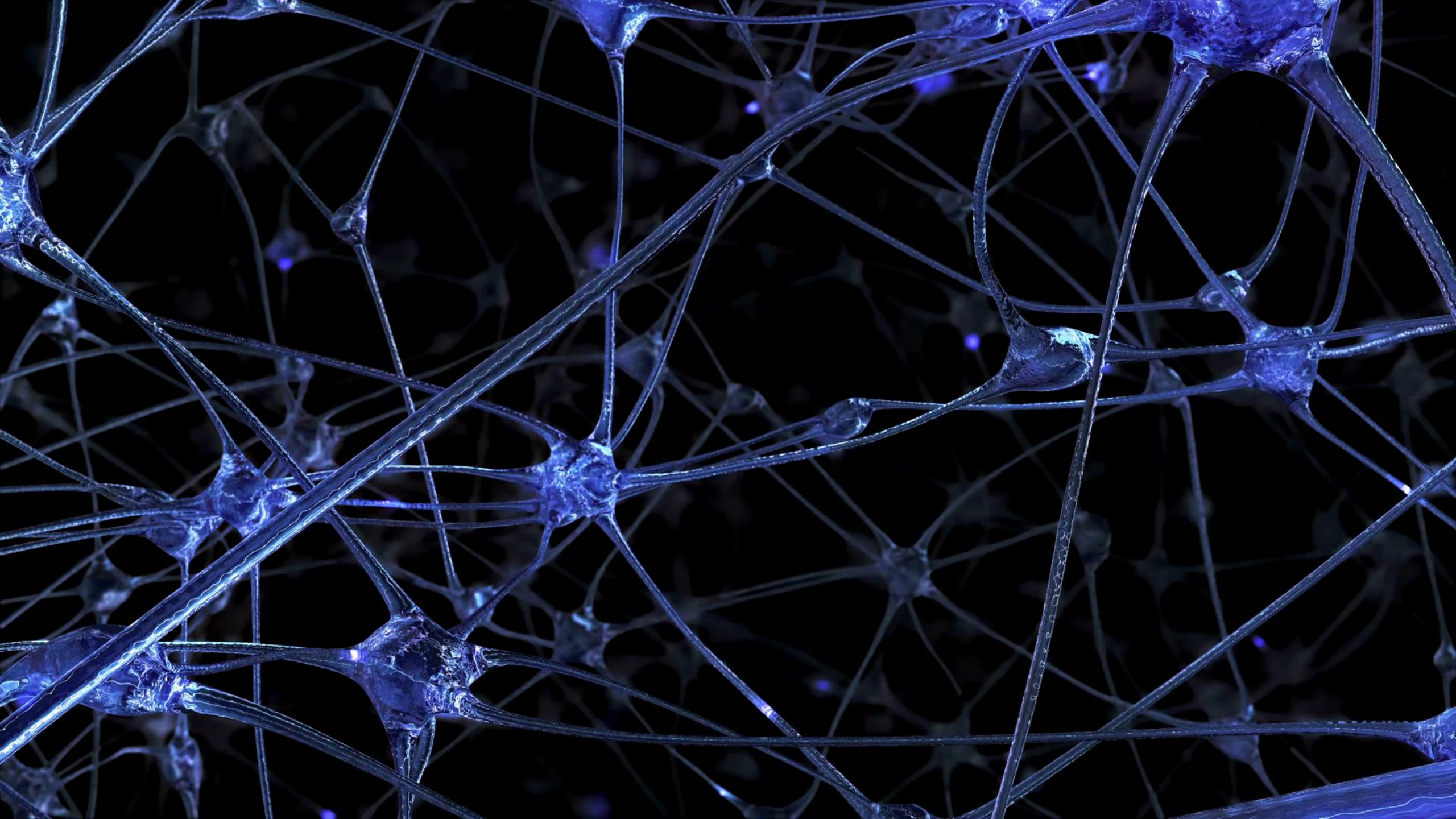
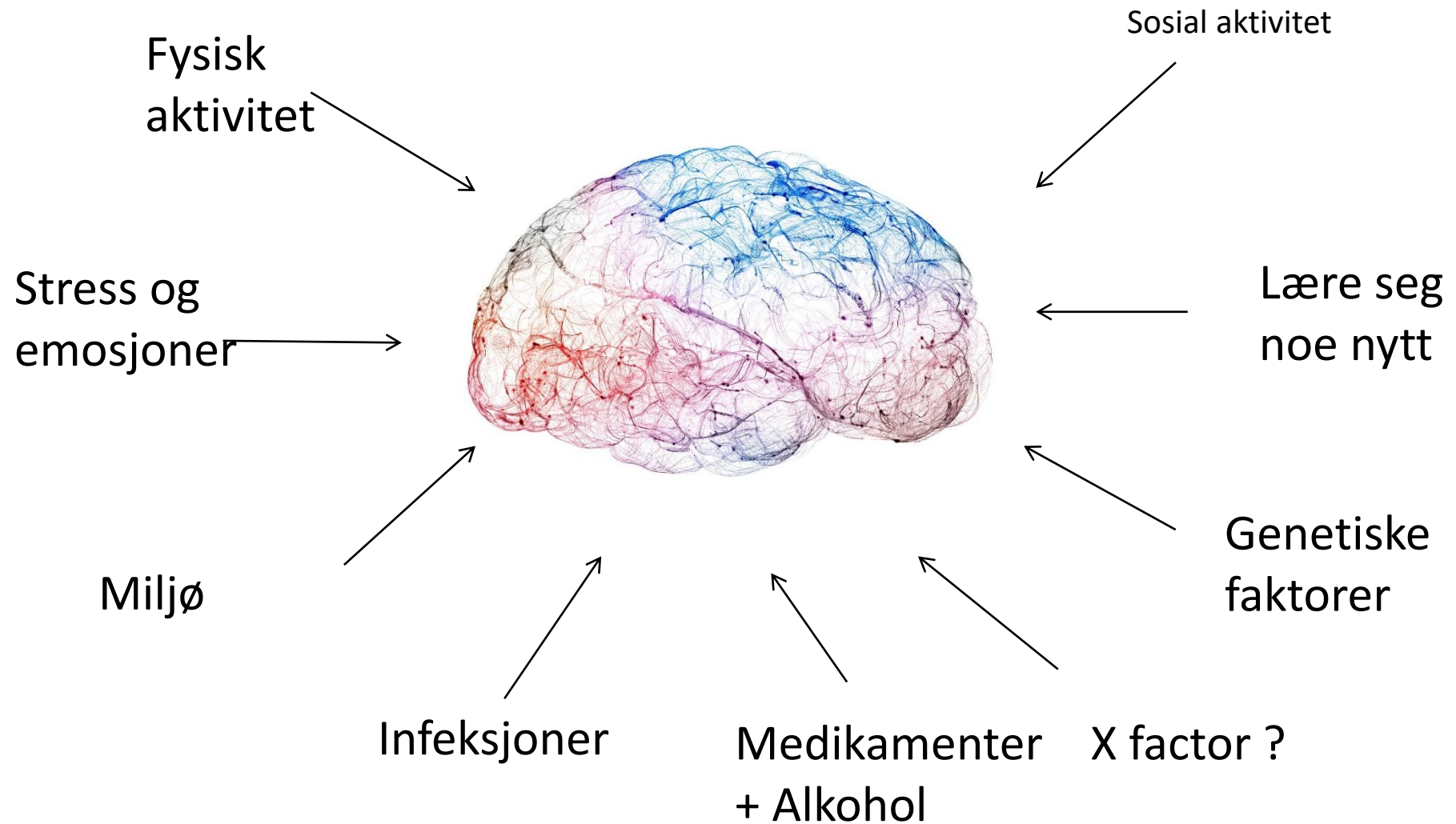


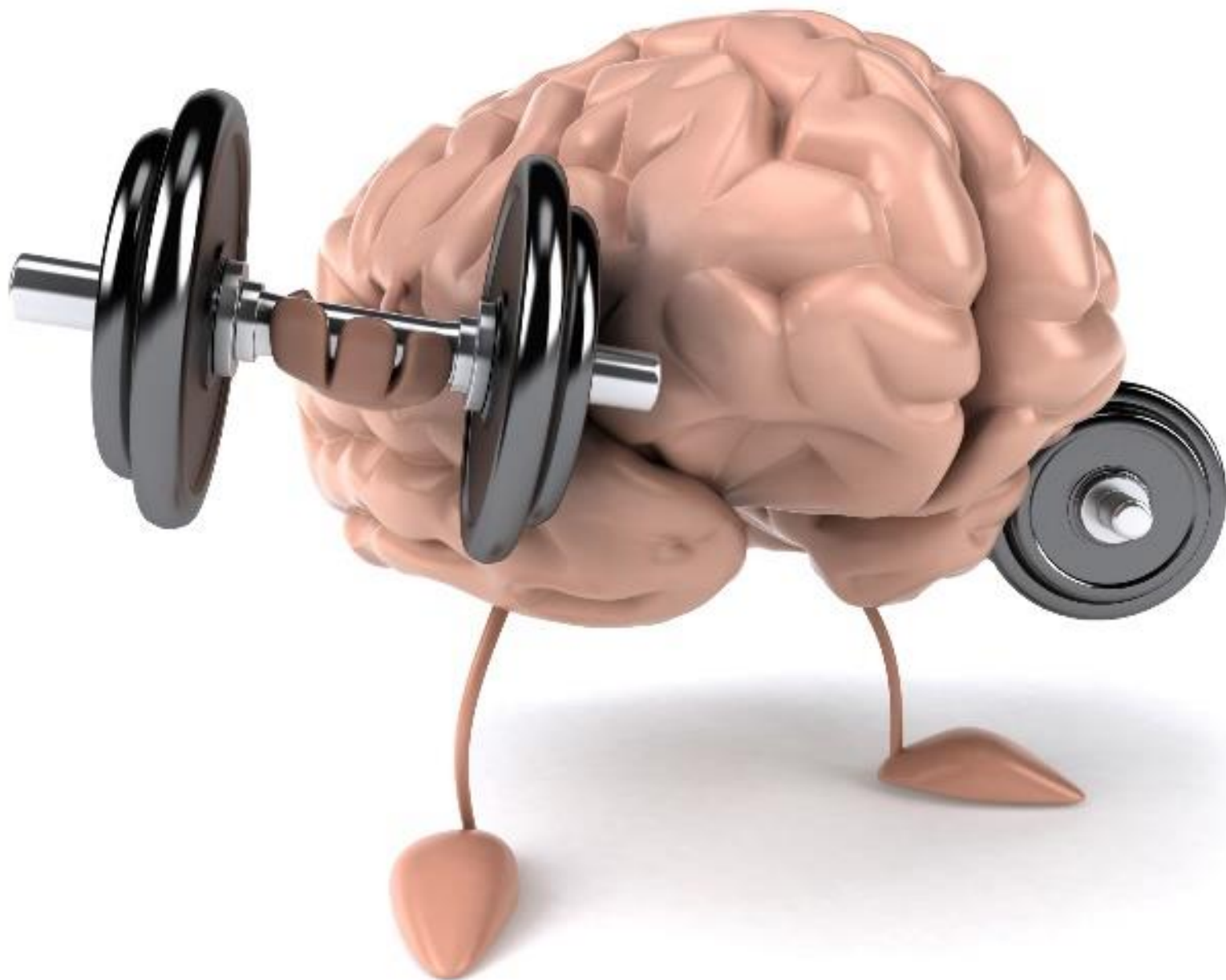
# Kognitiv trening – hvordan trene og hva vet vi om effekt?

Fagdirektør Susanne Hernes, Sørlandet sykehus HF  
Amanuensis II, Klinisk institutt 2, UiB



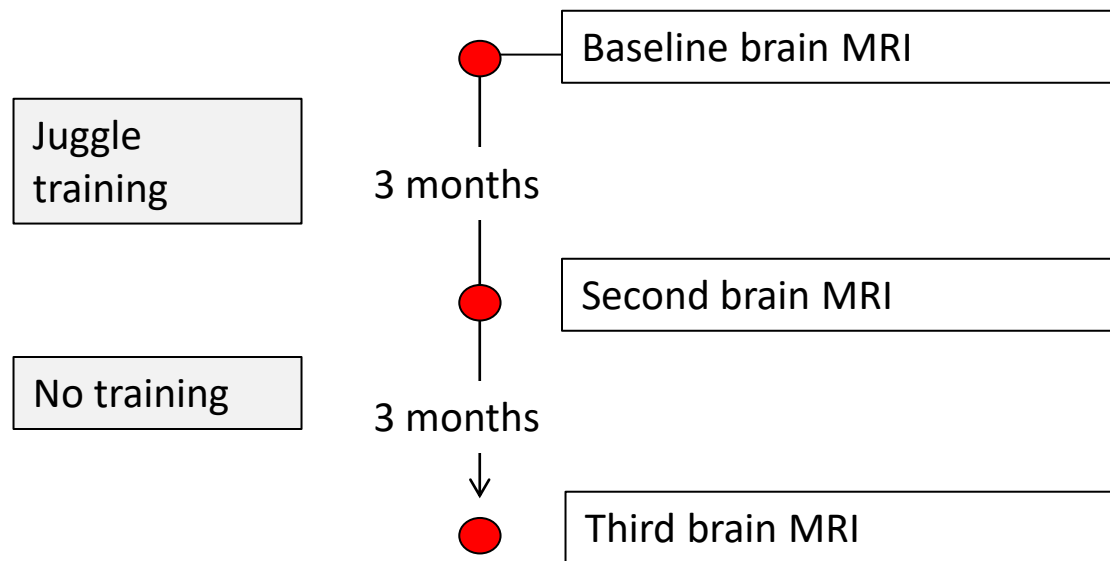
# Stimuli



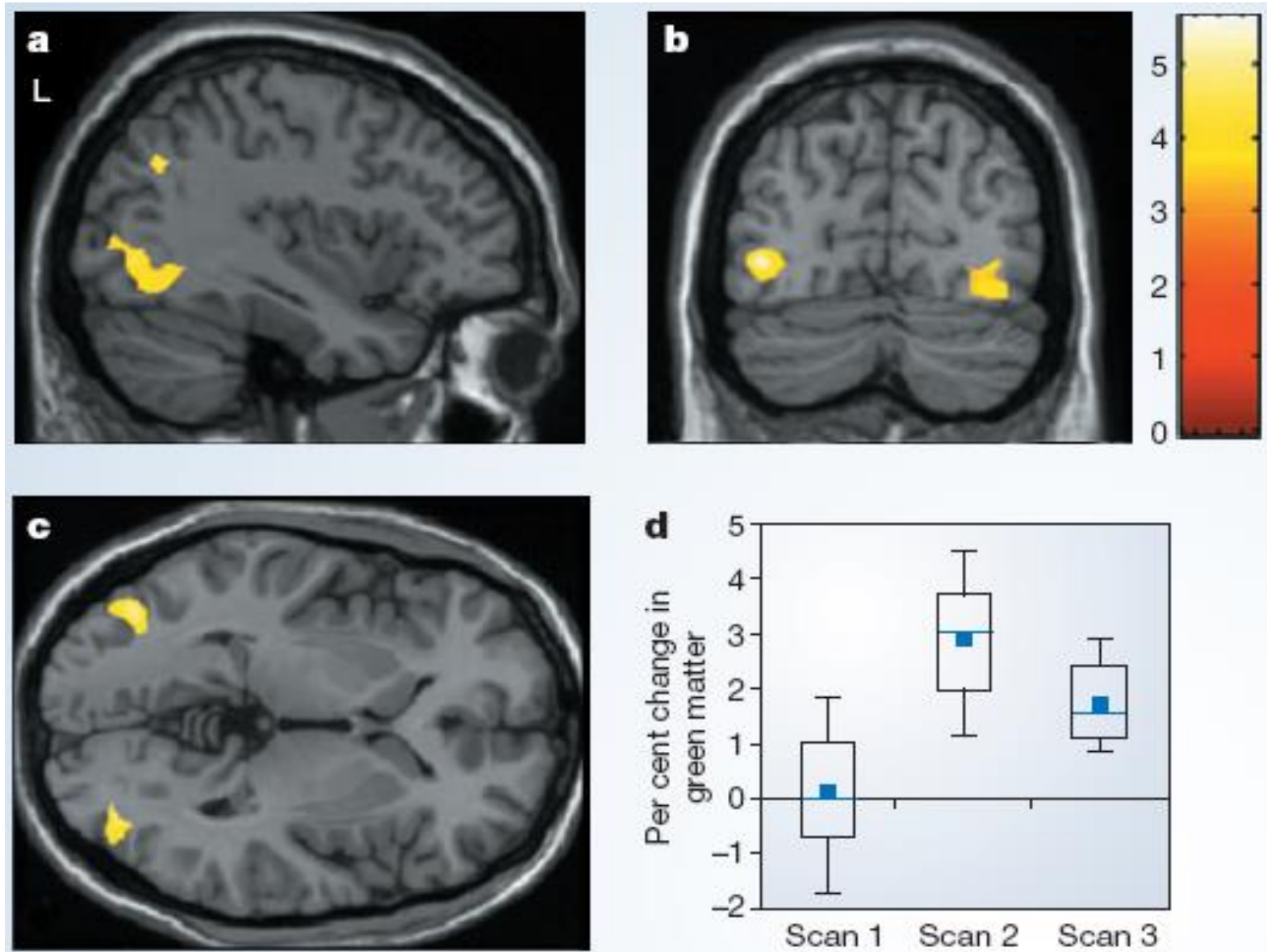


# The juggle study

- 24 adults aged  $22 \text{ yr} \pm 1.6$

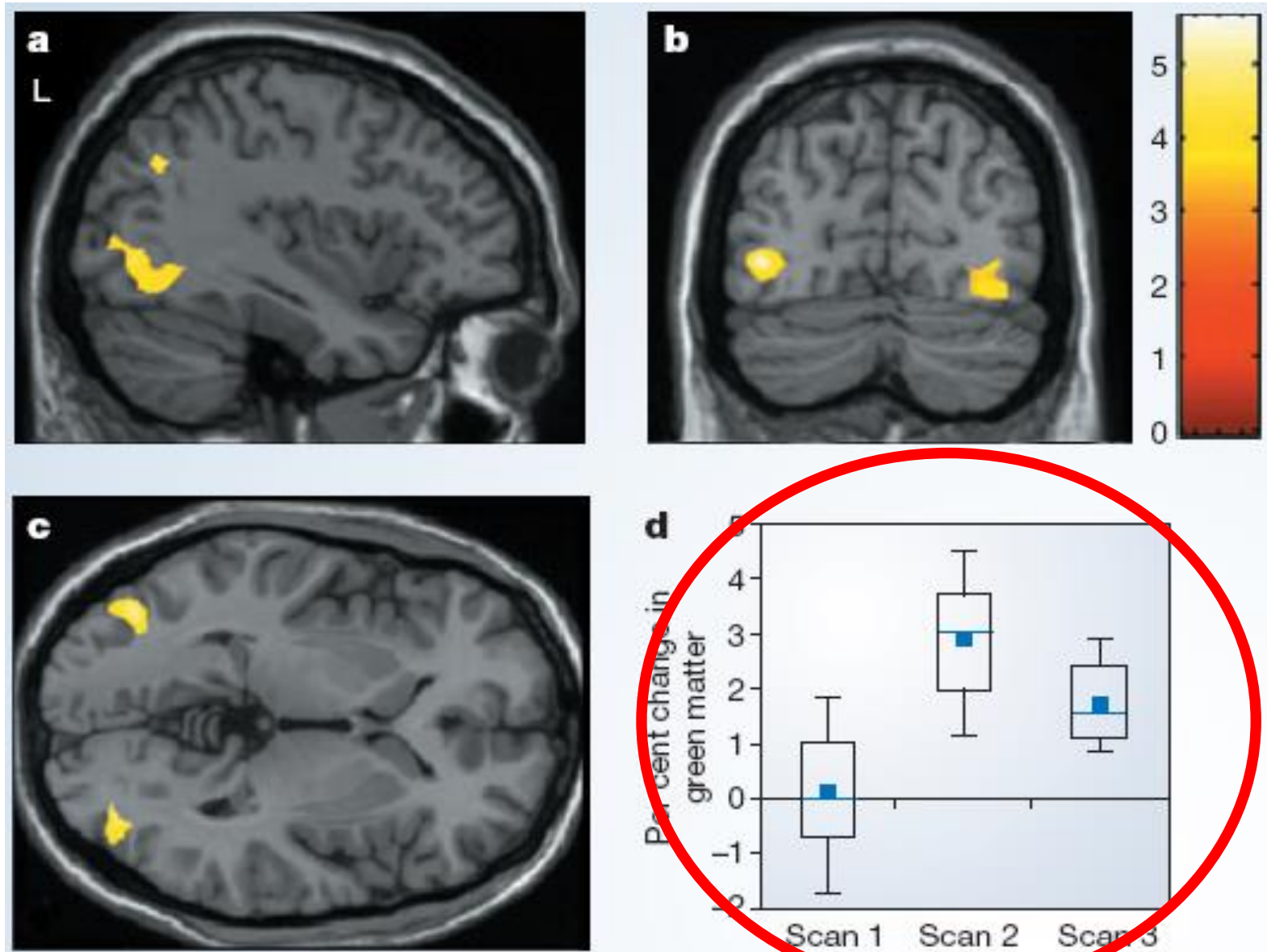


## The juggle study



*Draganski B et al. Nature 2004; 427:311*

## The juggle study



Draganski B et al. Nature 2004; 427:311

# London cab drivers

- Økt volum i midtre/bakre hippocampus sammenlignet med buss-sjåførere.
- Redusert volum i fremre hippocampus sammenlignet med buss-sjåførere.



Maguire, E. *Hippocampus* 16.12 (2006): 1091-1101.

# Neuroplasticity in older adults

Psychology and Aging  
2008, Vol. 23, No. 4, 720–730

Copyright 2008 by the American Psychological Association  
0882-7974/08/\$12.00 DOI: 10.1037/a0014296

## Plasticity of Executive Functioning in Young and Older Adults: Immediate Training Gains, Transfer, and Long-Term Maintenance

Erika Dahlin and Lars Nyberg  
Umeå University

Lars Bäckman  
Aging Research Center, Karolinska Institutet

Anna Stigsdotter Neely  
Umeå University

The authors investigated immediate training gains, transfer effects, and 18-month maintenance after 5 weeks of computer-based training in updating of information in working memory in young and older subjects. Trained young and older adults improved significantly more than controls on the criterion task (letter memory), and these gains were maintained 18 months later. Transfer effects were in general limited and restricted to the young participants, who showed transfer to an untrained task that required updating (3-back). The findings demonstrate substantial and durable plasticity of executive functioning across adulthood and old age, although there appear to be age-related constraints in the ability to

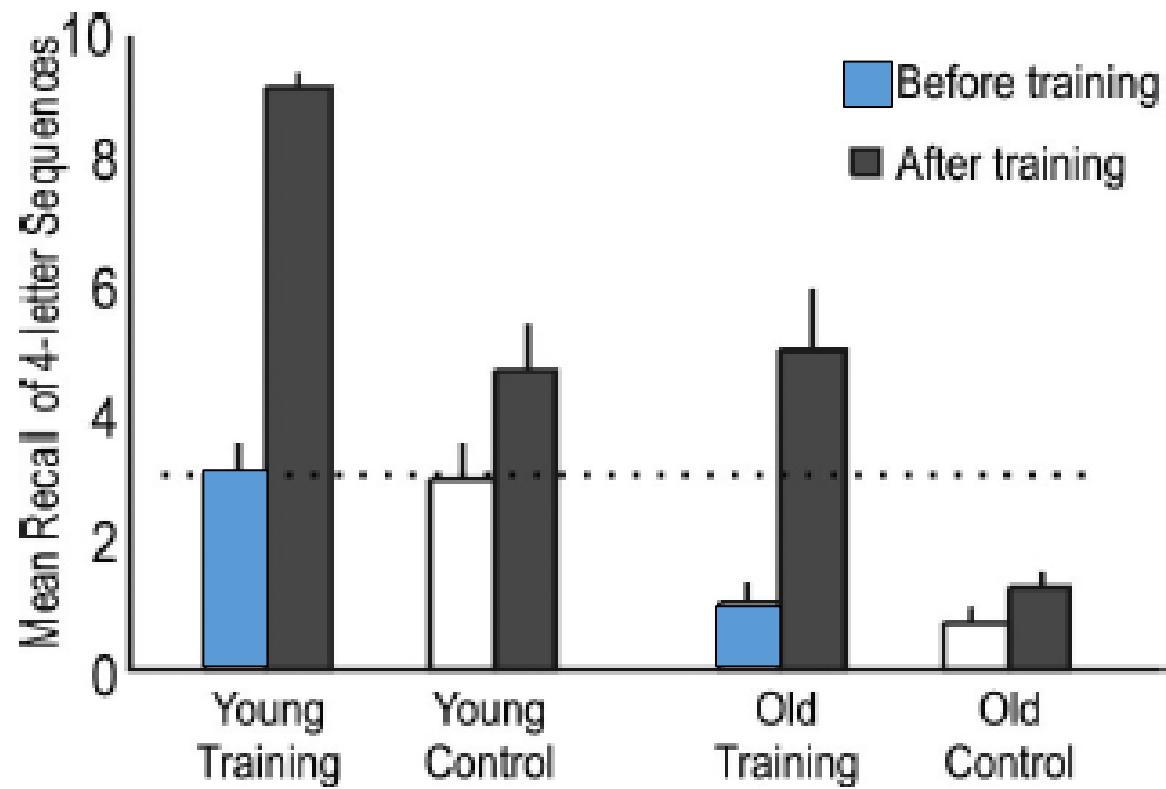
Table 1  
*Mean Subject Characteristics*

| Characteristic                   | Young<br>trained | Young<br>control | Old trained   | Old control   |
|----------------------------------|------------------|------------------|---------------|---------------|
| Women/men ( <i>n</i> )           | 8/7              | 4/7              | 7/6           | 11/5          |
| Age (years)                      | 23.67 (2.92)     | 24.09 (2.12)     | 68.38 (1.66)  | 68.25 (1.73)  |
| Education (years)                | 13.40 (1.40)     | 13.82 (1.87)     | 14.50 (4.07)  | 12.03 (3.00)  |
| Depression <sup>a</sup>          | 3.40 (3.27)      | 3.64 (3.26)      | 3.46 (3.23)   | 6.31 (4.41)   |
| Verbal ability <sup>b</sup>      | 22.67 (2.61)     | 22.09 (3.62)     | 22.38 (5.01)  | 23.25 (3.84)  |
| Mental status <sup>c</sup>       | 29.00 (0.93)     | 29.18 (0.87)     | 28.69 (1.03)  | 28.81 (0.66)  |
| Trail Making Test A <sup>d</sup> | 25.57 (7.74)     | 27.79 (10.55)    | 41.98 (12.59) | 43.09 (12.92) |
| Trail Making Test B <sup>d</sup> | 61.92 (16.94)    | 49.06 (17.13)    | 97.07 (30.55) | 95.74 (26.05) |
| Pattern comparison <sup>e</sup>  | 21.27 (2.74)     | 21.45 (4.16)     | 15.38 (1.79)  | 13.97 (2.25)  |

*Note.* Standard deviations are given in parentheses.

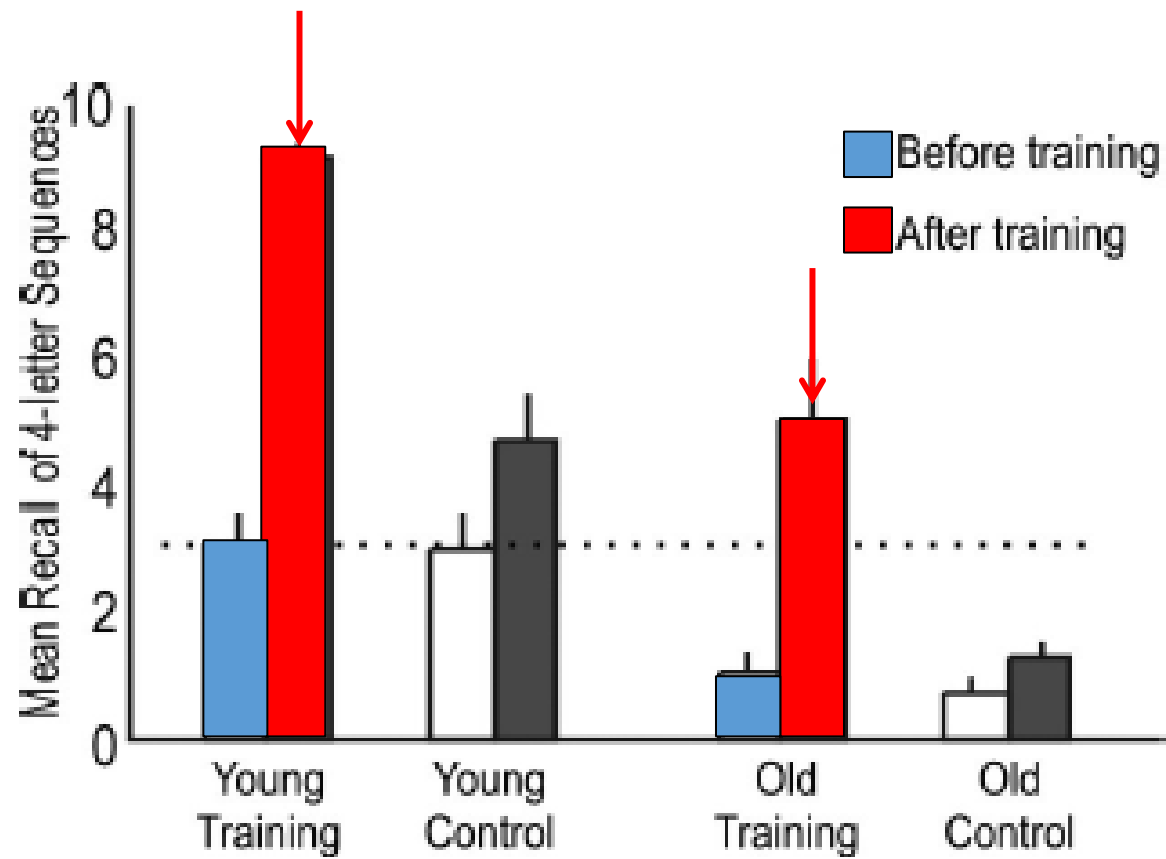
<sup>a</sup> Beck Depression Inventory (Beck & Steer, 1996). <sup>b</sup> SRB1 (Dureman & Sälde, 1959; maximum score = 30). <sup>c</sup> Mini-Mental State Examination (Folstein et al., 1975). <sup>d</sup> Trail Making Tests A and B (Lezak, 1983). <sup>e</sup> Pattern comparison (Salthouse & Babcock, 1991).

# Age



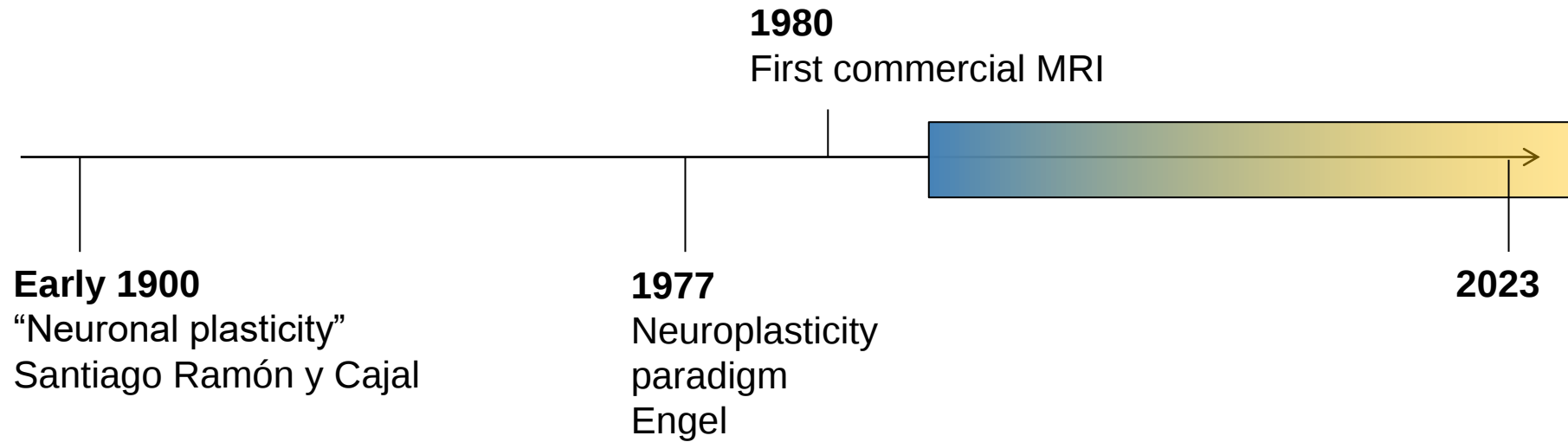
Dahlin, et.al. 2008

# Age



Dahlin, et.al. 2008

# Timeline of neuroplastic research



# Regelmessig trening av hjernen gir bedre nervetråder



# Forskjellige typer tiltak

## **PRESERVE/BEVARE**

- Being social
- Exercising
- Reading
- Blood pressure control

# Forskjellige typer tiltak

## **PRESERVE/BEVARE**

- Being social
- Exercising
- Reading
- Blood pressure control

## **IMPROVE/FORBEDRE**

**STRATEGY  
LEARNING**

**COGNITIVE  
TRAINING**

# Forskjellige typer trening

## **PRESERVE/BEVARE**

- Being social
- Exercising
- Reading
- Blood pressure control

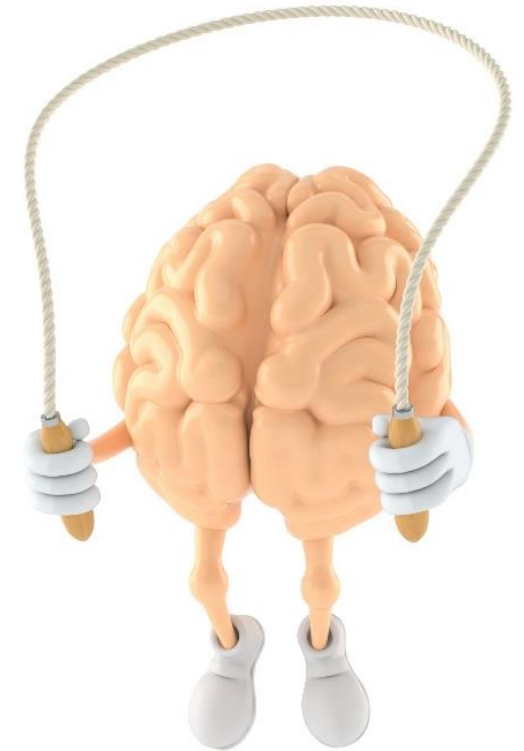
## **IMPROVE/FORBEDRE**

**STRATEGY  
LEARNING**

**COGNITIVE  
TRAINING**

# Effektiv hjernetrening ser ut til å måtte...

- Trene en av hjernens kjernefunksjoner
- Pågå over minst 4-6 uker, minimum 30 ganger/uke
- Økende vanskelighetsgrad
- Use it or loose it



# Kan hjernetrening forbedre nervetråder i hjerner med sykdom?



- Bedre hukommelse?
- Lettere hverdag?
- Bedre livskvalitet for både deltagere og pårørende?



**SATSER PÅ KLINISKE STUDIER:** – Det er ingen tvil om at pandemien har hjulpet oss; at vi får denne satsingen – for regjeringen handler det om å komme styrket ut av pandemien. Her ligger grunnlag for å skape nye lønnsomme arbeidsplasser i Norge, sier helseminister Bent Høie (H) til Dagens Medisin.

**Foto:** Vidar Sandnes

## Ny handlingsplan: Langt flere pasienter skal få delta i kliniske studier

Flere pasienter i spesialisthelsetjenesten skal nå få mulighet til å delta i kliniske studier som en del av behandlingen, lover helseministeren.

*Anne Grete Storvik*

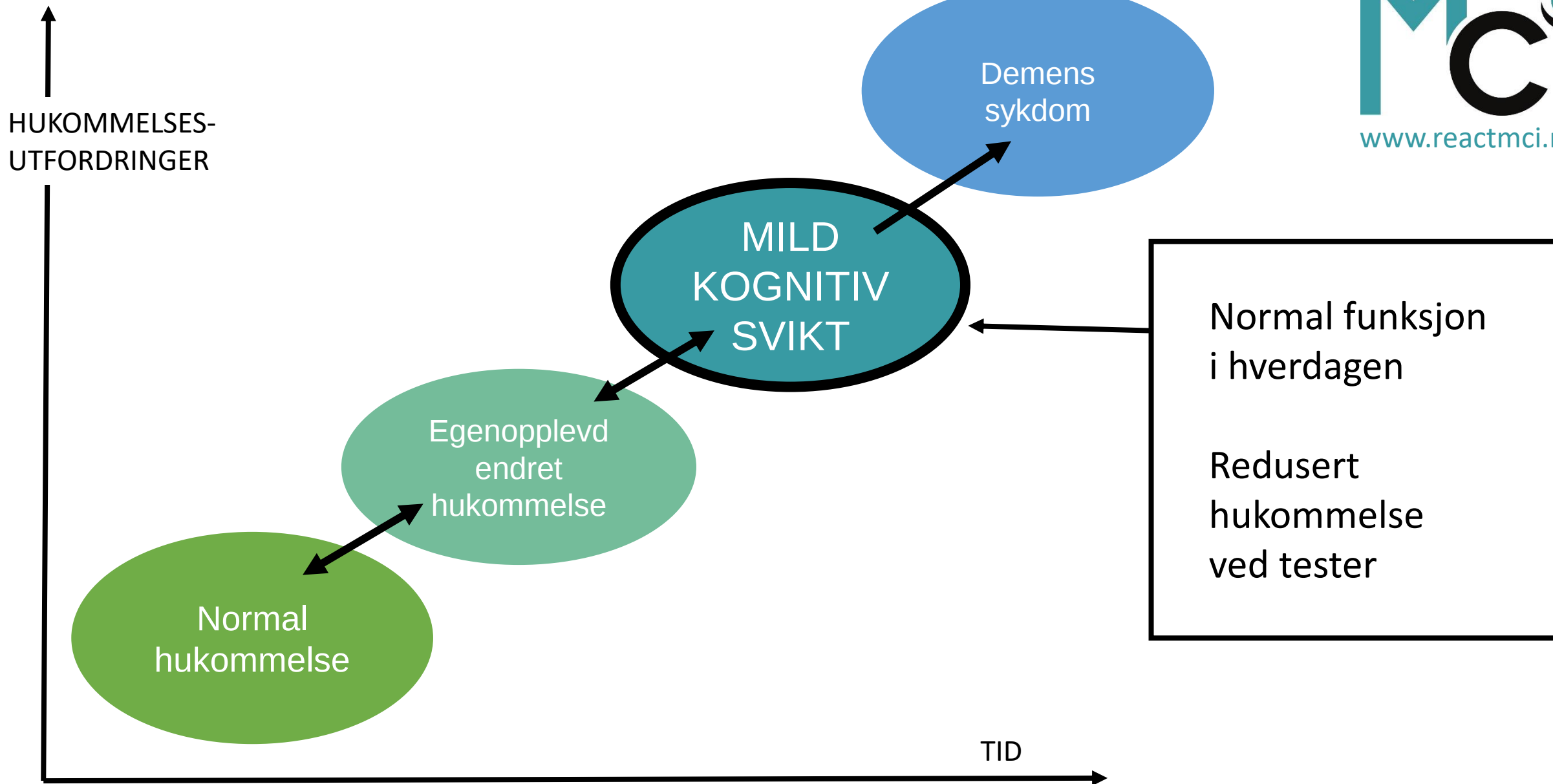
PUBLISERT Mandag 11. januar 2021 - 17:55

# REACT MCI

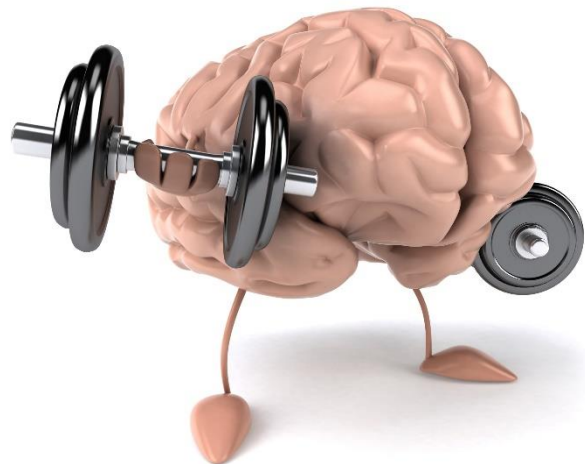
En nasjonal studie for personer med  
mild kognitiv svikt og deres  
pårørende

Susanne Hernes, Overlege, Ph.d, prosjektleder





# Vi undersøker ....



Kan hjernen trenes  
som en muskel?

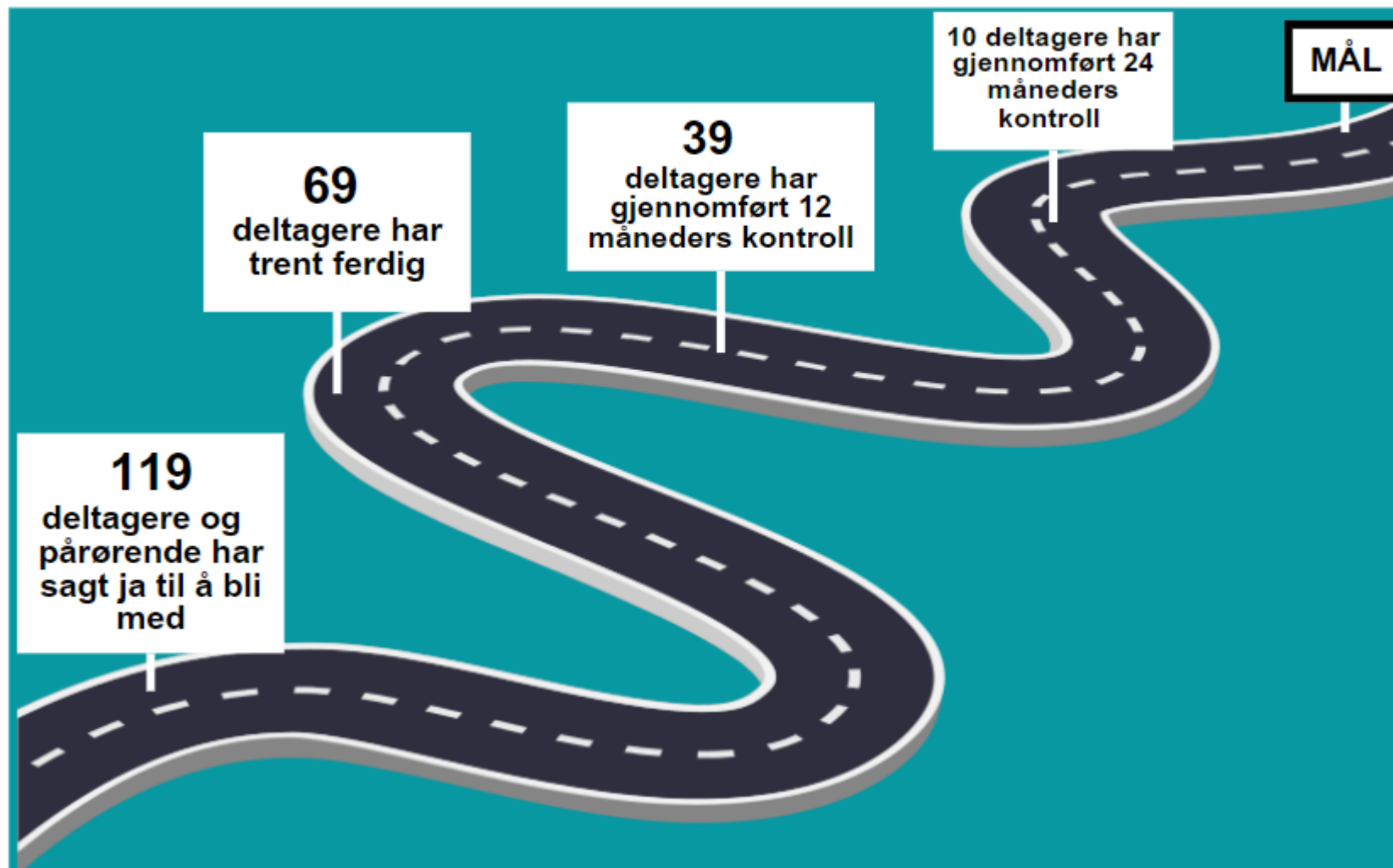


Hvordan vaskes  
hjernen hos  
deltagerne?



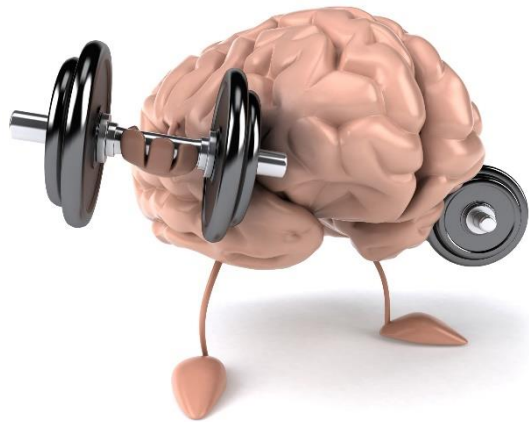
Hvordan er livskvalitet  
og helse hos deltager  
og pårørende?

# Veikart for studien

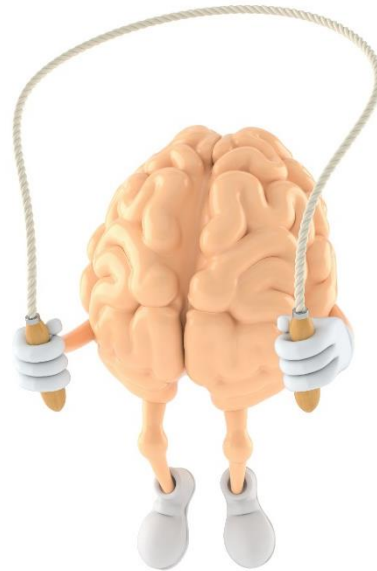


- Vi trenger 213 deltagere før høsten 2024

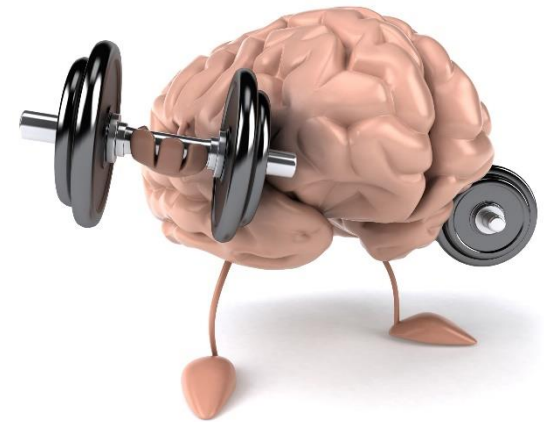
# Hjernetrening på datamaskin eller nettbrett



**GRUPPE 1**



**GRUPPE 2**



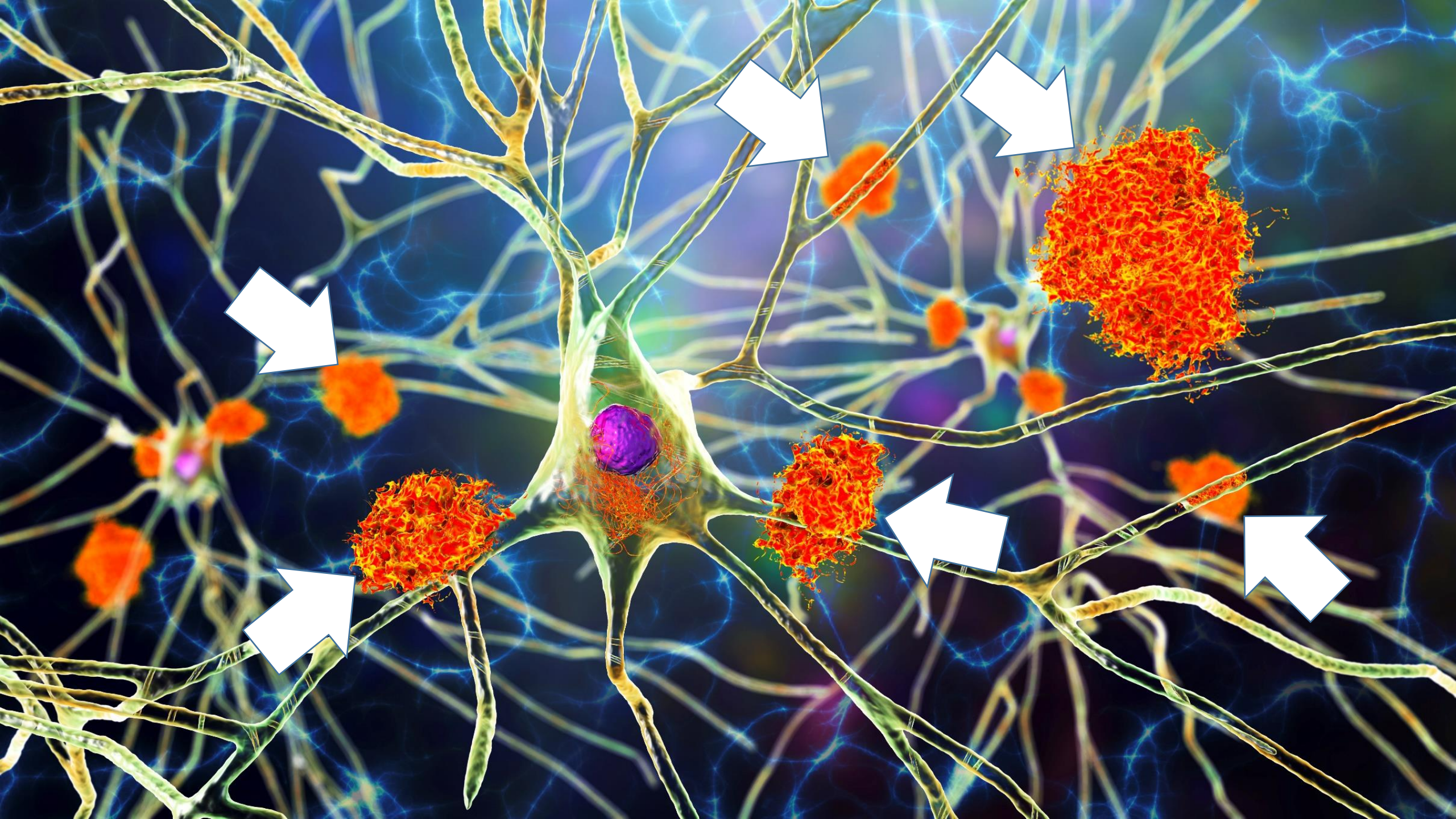
**GRUPPE 3**

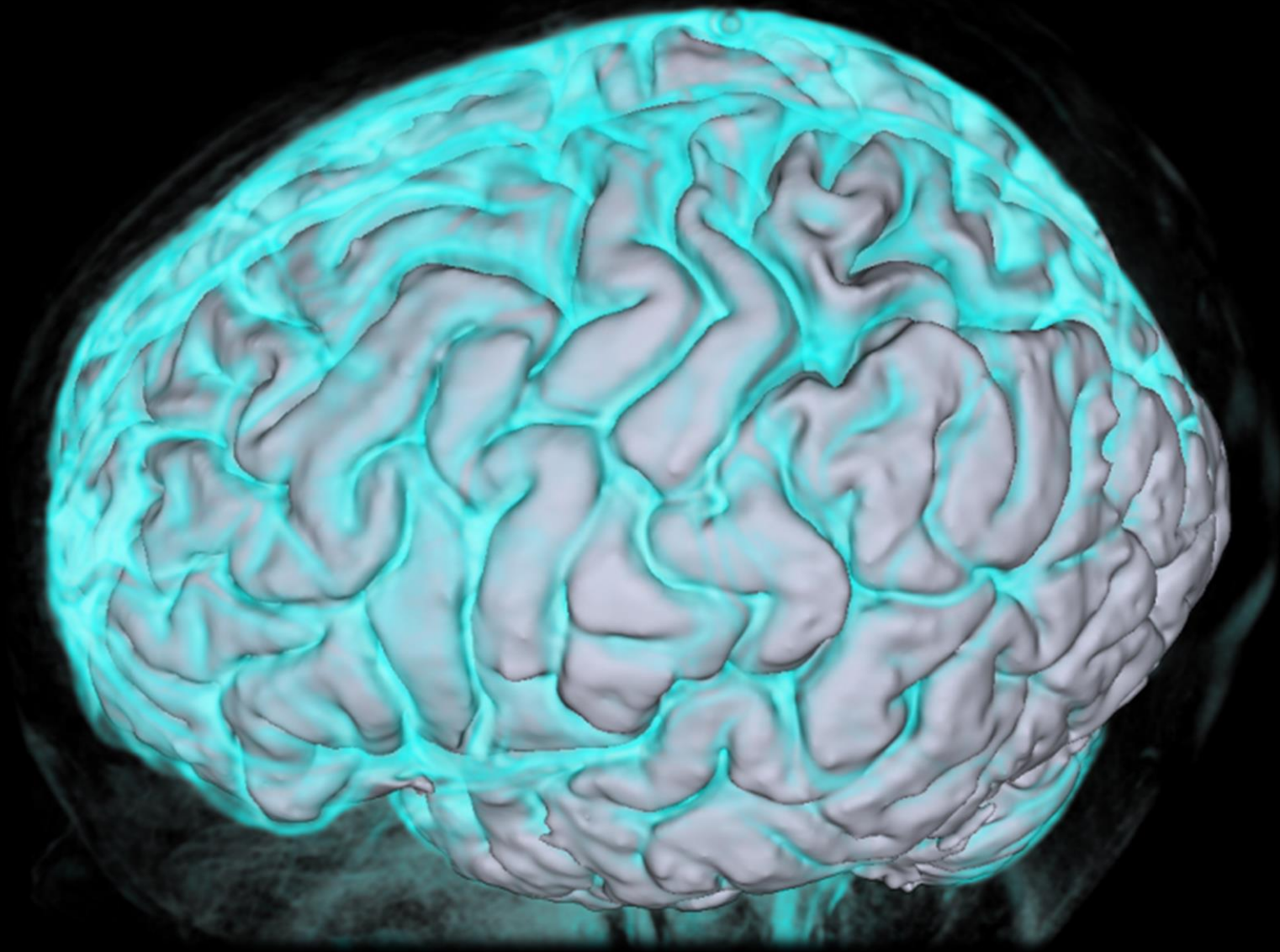
# Hvis det viser seg at treningen har effekt...



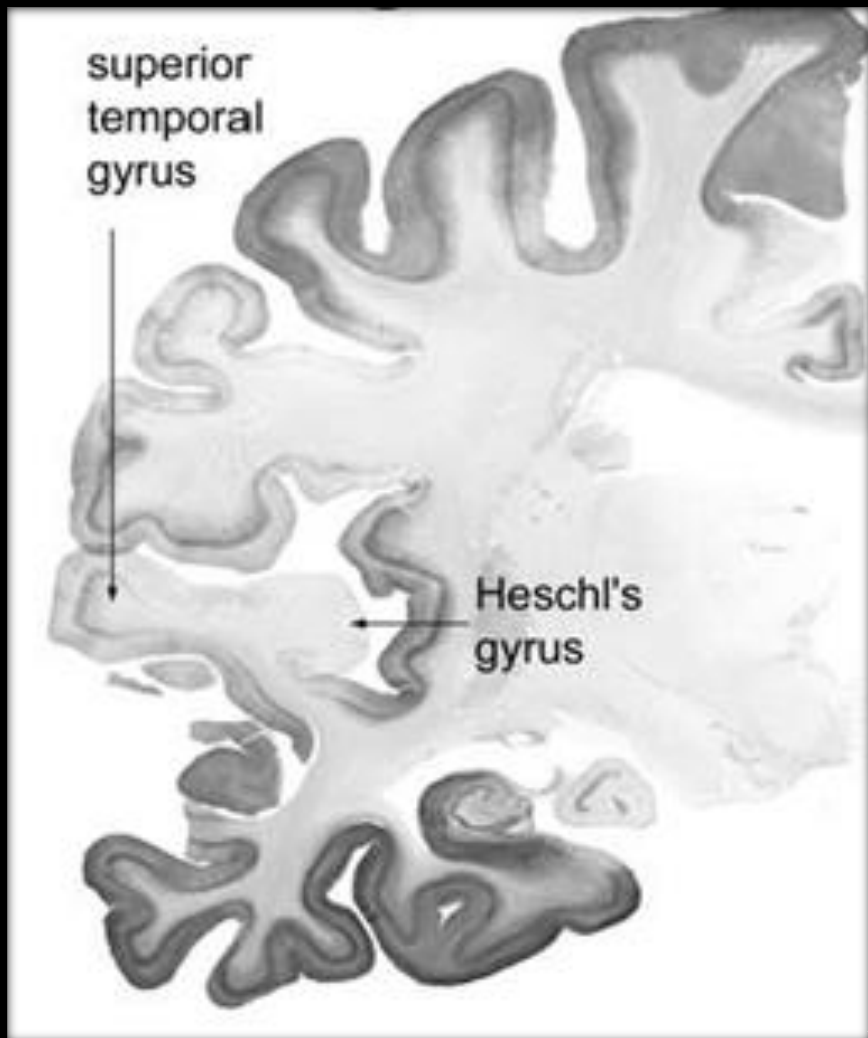
Et helt nytt tilbud ved mild kognitiv  
svikt

Tilbudet vil kunne uavhengig av hvor  
man bor eller avstand til sykehus

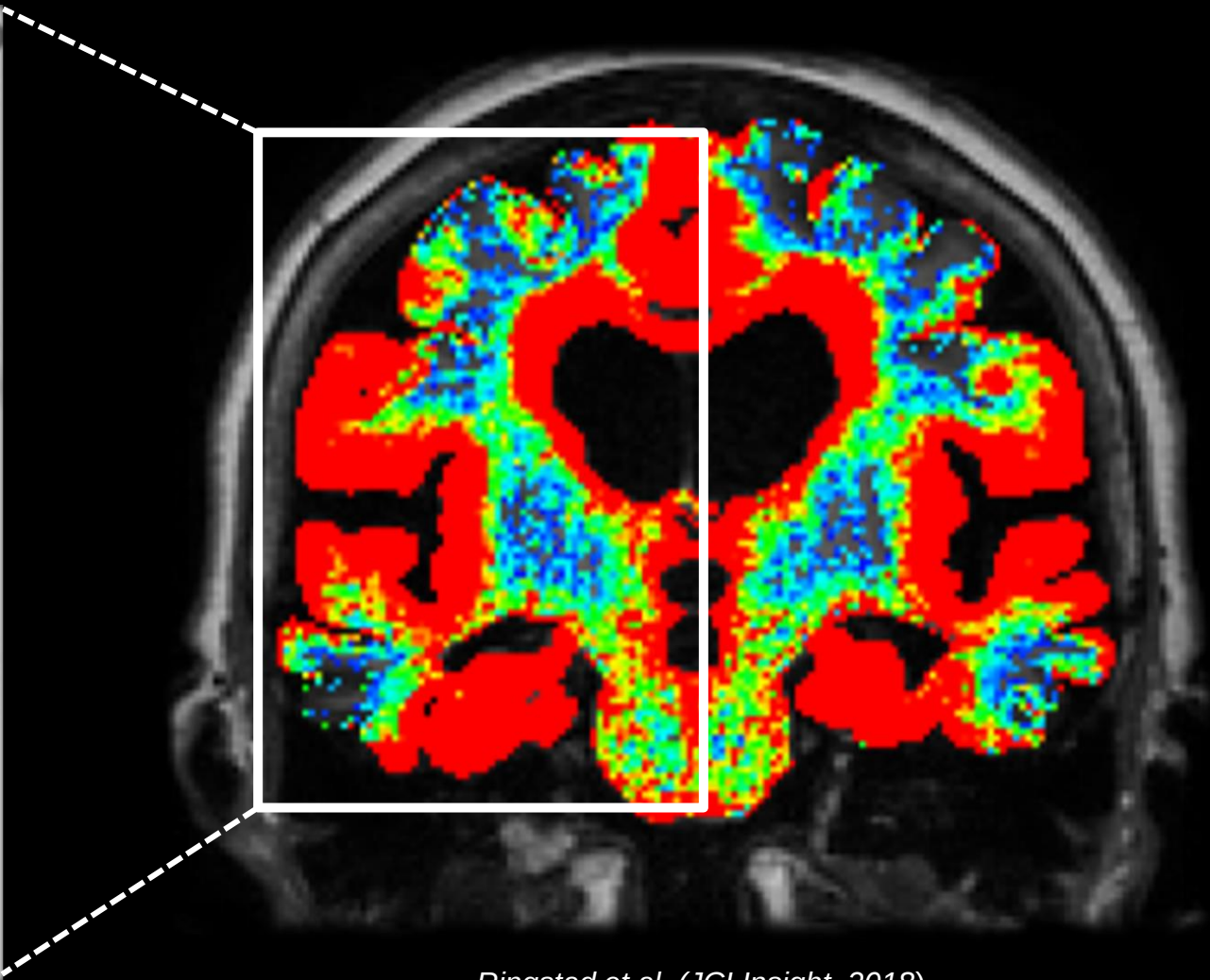




*Bilde: Tomas Sakinis, Oslo Universitetssykehus*

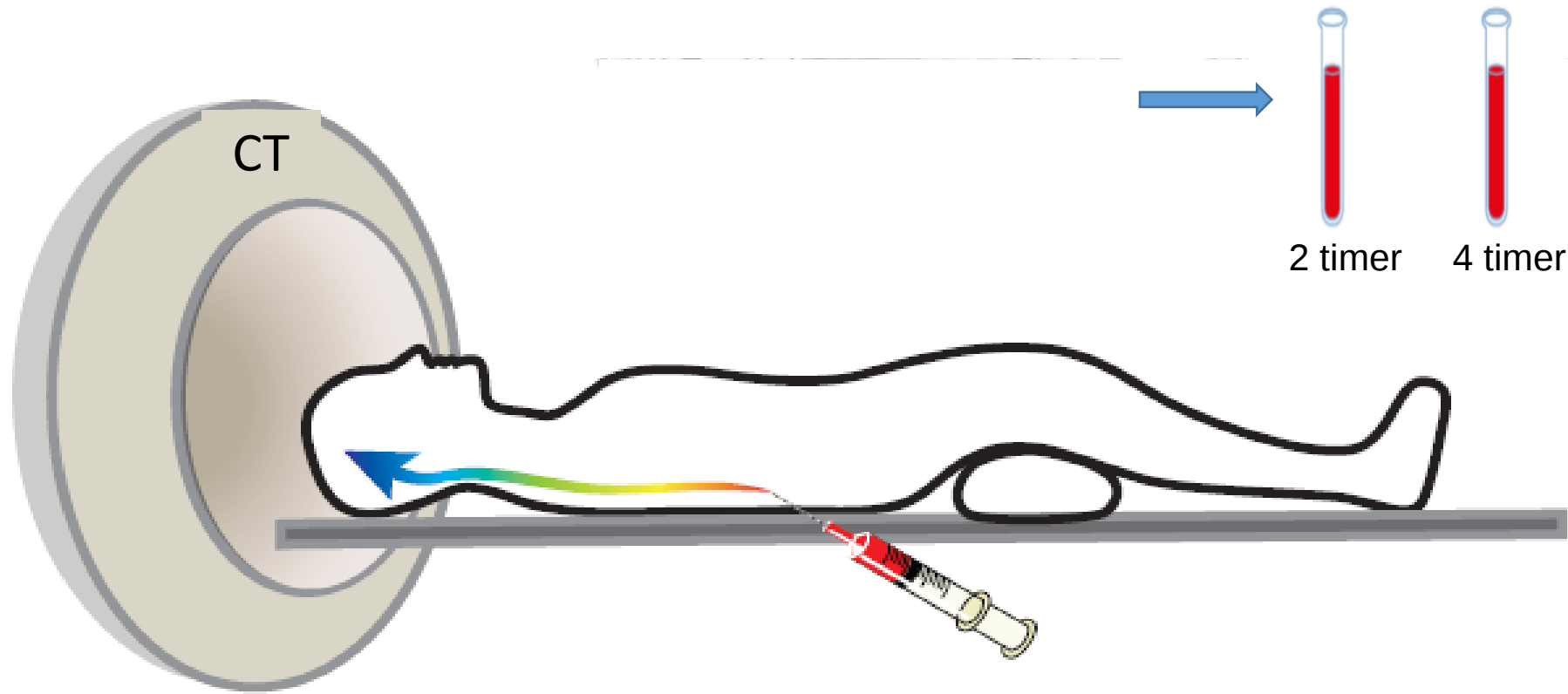


*Braak et al. (Acta Neuropathol, 2006)*

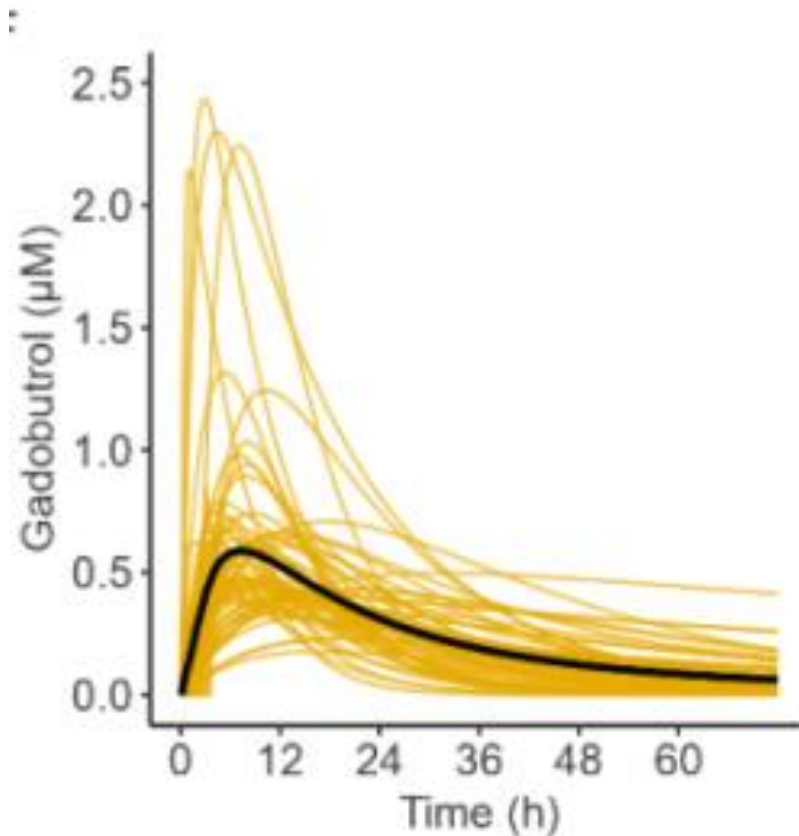


*Ringstad et al. (JCI Insight, 2018)*

# Slik undersøker vi vaskesystemet



# Hvor effektivt er vaskesystemet?



Sporstoffet beveger seg forskjellig fra hjernevæske over i blodet etter hvor effektivt hjernens vaskesystem er.

*Hovd et al., Fluids Barriers CNS, 2022*

# Vi håper å ...



- ... finne ut om hjernetrening bør være et tilbud til personer med mild kognitiv svikt
- ...finne den gruppen som vil ha best nytte av trening
- ...beskrive hvordan hjernen vaskes hos personer med mild kognitiv svikt for å kunne finne utgangspunkt for nye medisiner



# VIL DU VITE MER OM STUDIEN?

[www.reactmci.no](http://www.reactmci.no)



Følg oss på Facebook: React MCI



Universitetet i Bergen