

Mental Activity and Dementia: A Case of Use it or Lose it?

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Mental activity and dementia

Overview

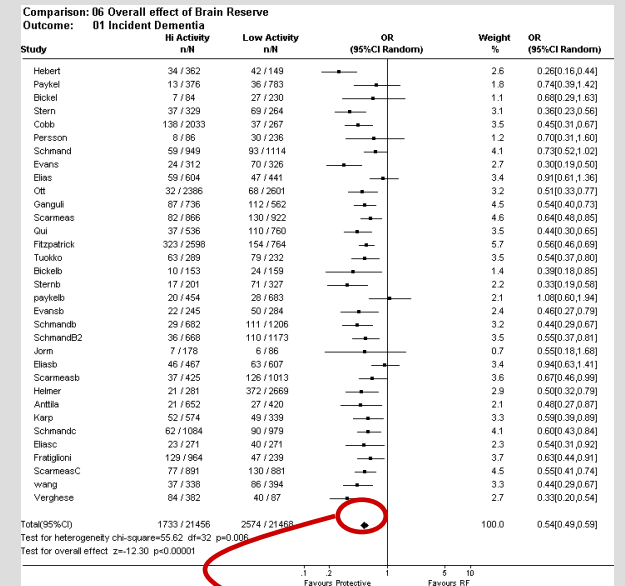
- ❑ Is mental activity really important?
- ❑ How can mental activity change the biology of Alzheimer's Disease?
- ❑ What kind of mental activity is effective?



Is mental activity really important?

Mental Activity and Dementia Risk

- ❑ We surveyed 22 international studies, comprising more than 21,000 individuals overall
- ❑ Found that those with high levels of mental activity were at almost half the risk for developing dementia
- ❑ Mental activity was measured by level of education, occupational complexity or cognitive lifestyle activities
- ❑ *Complex mental activity reduces risk for dementia*
- ❑ How could this be?



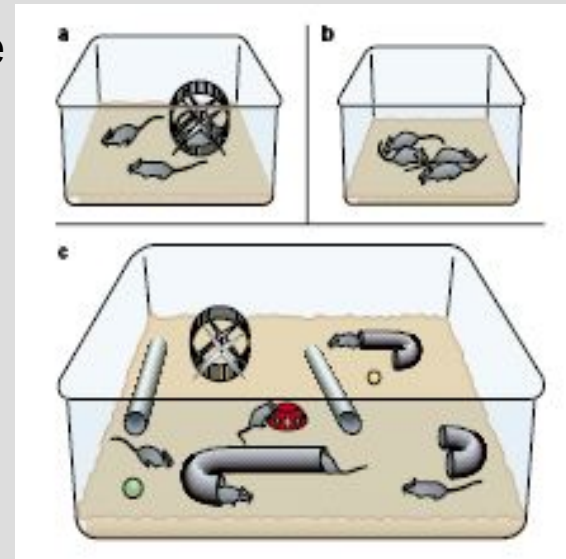
OR 0.54 (CI: 0.49-0.59)



How could this work?

Mental Activity in Mice

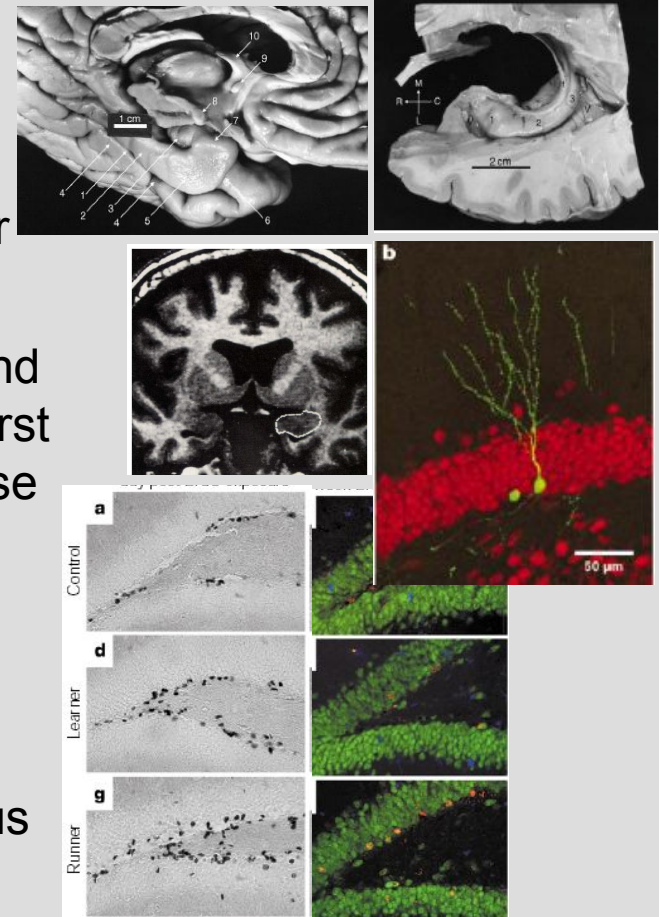
- ❑ Effects of mental activity on the brain have been studied using 'environmental enrichment'
- ❑ Enrichment involves comparing standard housing to housing with more littermates, more toys, more exercise devices
- ❑ Dozens of studies have now shown that mice reared in enriched environments perform much better on tests of memory, problem solving, reaction time etc
- ❑ Enrichment also has a number of effects on the mouse brain



How could this work?

Neurogenesis

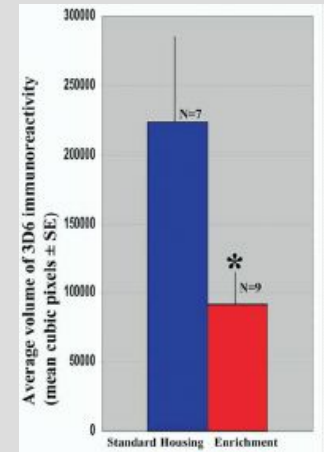
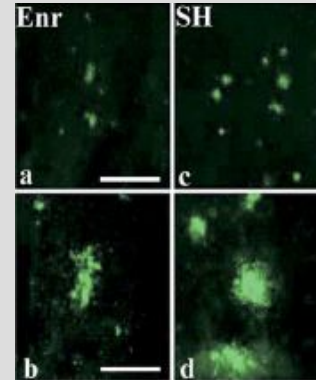
- ❑ Neurogenesis refs to the process of producing new brain cells (neurons)
- ❑ Is common in adult mammals, even older mammals!
- ❑ Hippocampus is important for memory and loss of neurons in this area is critical to first clinical expression of Alzheimer's Disease
- ❑ Increased mental activity (via environmental enrichment) increases number and survival of newly created neurons *in hippocampus*
- ❑ Generating more neurons in hippocampus may counteract expression of AD



How could this work?

Alzheimer's Disease Pathology

- ❑ Scientists use genetically modified mice which simulate some of the biological and cognitive effects of Alzheimer's Disease
- ❑ Amyloid plaques (abnormal proteins) are central marker of Alzheimer's Disease
- ❑ One study tested effect of 5 months of environmental enrichment on development of AD plaques
- ❑ They found a 50% reduction in number and size of plaques compared to standard housing

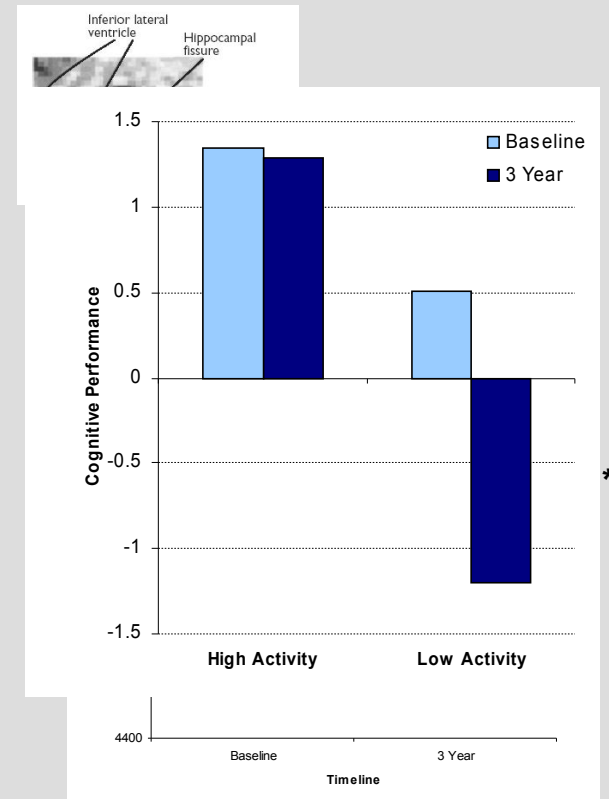


Lazarov et al (2005)

How could this work?

Hippocampus Shrinkage

- ❑ Sydney Stroke Study (Professors Sachdev and Brodaty)
- ❑ 81 healthy elderly followed up for more 3 years
- ❑ At the start of study, *Lifetime of Experiences Questionnaire* (LEQ) assessed complex mental activity across lifespan -> LEQ score
- ❑ High LEQ people had much less cognitive decline over three years
- ❑ High LEQ people had 50% less shrinkage of hippocampus over three years



What kind of mental activity?

Three Key Ingredients

Human studies in general support mice findings. Ideal mental activity will therefore have three key ingredients:

3. **Cognitive:** activity should involve an aspect of learning something new, problem solving, remembering or strategy
4. **Social:** activity should occur with other people. Proper socialisation demands good cognitive and physical activity as well!
5. **Physical:** activity should involve some type of physical exercise or skill



What kind of mental activity?

Suggestions

Has to be fun! A new passion or hobby that you will continue to practice and learn for the rest of your life is going to be the most effective...

Learn to Dance

Practice Tai Chi

Take up Sailing

Modify your own past-time if a key ingredient is missing



THANKS

Professor Brodaty for invitation

Professor Perminder Sachdev

