Neurogenesis - The New Target for Drug Development

**BACKGROUND**

**NEUROGENESIS - THE NEW TARGET FOR DRUG DEVELOPMENT**

**METHODS**

**THE CDR SYSTEM PICTURE RECOGNITION TASK: AN OBJECT PATTERN SEPARATION TASK**

**RESULTS**

**NORMAL AGEING & NEUROGENESIS**

First replication confirming pattern separation (ability to reject closely similar pictures) to be impaired by normal human ageing. Plus extension showing declines occur much earlier than 65+ years 3,021 healthy males and females aged from 18 to 87 years.

**NEUROGENESIS CAN BE ASSESSED BY**

**CONDITIONS WITH EVIDENCE OF COMPROMISED NEUROGENESIS**

- Amnestic Mild Cognitive Impairment (aMCI) • Patients with aMCI • Closely similar but different pictures to controls but not significantly impaired (p=0.25), but significantly impaired on the ability to identify original pictures (p=0.0001). Impaired DG sensitive OPS.

- Alzheimer’s disease & Dementia with Lewy Bodies • Patients with AD • Closely similar but different pictures to controls but not significantly impaired (p=0.25), but significantly impaired on the ability to identify original pictures (p=0.0001). Impaired DG sensitive OPS.

- Parkinson’s Disease • The first patients were not different in the ability to reject similar pictures to controls on the ability to reject similar pictures to controls. However they were poorer at identifying the original pictures. LLD impaired on all major CDR System domains.

**CONDITIONS WITH NO EVIDENCE OF IMPAIRED NEUROGENESIS**

- Stroke & Vascular Dementia
- Schizophrenia
- Late-Life Depression (LLD)
- Chronic Pain
- Epilepsy
- Oncology

**Further replication of findings with 93,087 potential preclinical AD subjects assessed via the internet.**

**Preclinical AD & Neurogenesis**

- CDR System Picture Recognition task data gathered via the internet in 93,087 subjects aged 18-85 years. Both accuracy & speed show selective DG neurogenesis declines more than other regions.

**CONCLUSIONS**

**THE FINAL PIECE OF THE JIGSAW, EVIDENCE THAT IMPROVING NEUROGENESIS WILL IMPROVE OBJECT PATTERN SEPARATION**

**Role of object pattern separation tasks in drug development**

- Object pattern separation tasks:
  - Can confirm compromised neurogenesis at the human level.
  - Can serve as a proof of principle that a novel therapy is acting at the dentate gyrus & influencing neurogenesis.
  - Also provide a therapeutic marker of response, i.e. can act as an outcome measure.

The CDR System task:

- Has already been extensively validated for such use.
- Takes a few minutes to administer (4-5 mins).
- Can be performed by virtually any medical population.
- Has over 60 parallel versions (% language versions).
- Can be administered via the internet.

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