



KHARKIV NATIONAL MEDICAL UNIVERSITY
DEPARTMENT OF PATHOLOGICAL ANATOMY

RNA Content in Hippocampal Neurons: Insights from a Model of Alzheimer's Disease And Stem Cell Treatment.

Okonkwo Emmanuella .I.

Experiment Reseacher: Lukyanova Y.M

Scientific Adviser: Prof. G.I Gubina-Vakulik

2024

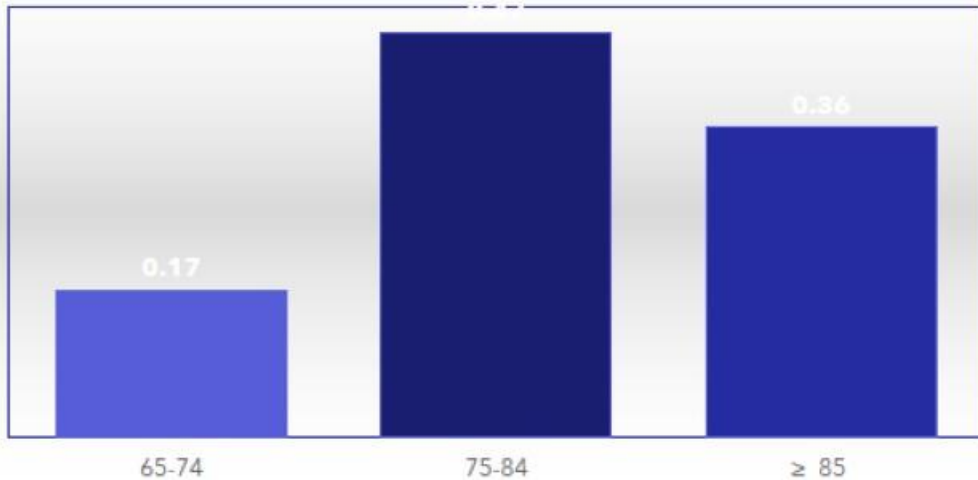
INTRODUCTION

- • Most common cause dementia
- • Degeneration of cortex
- • Contrast with basal ganglia in movement disorders
- • Generalized → no focal deficits
- • Characterized by loss of ACh cortical activity
- • Deficiency of choline acetyltransferase
- • Prominent in basal nucleus of Meynert and hippocampus

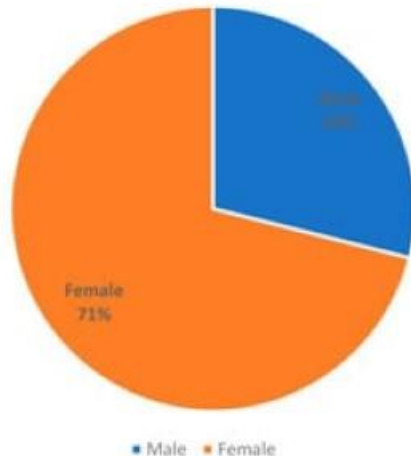


EPIDEMIOLOGY

Number of Individuals with AD

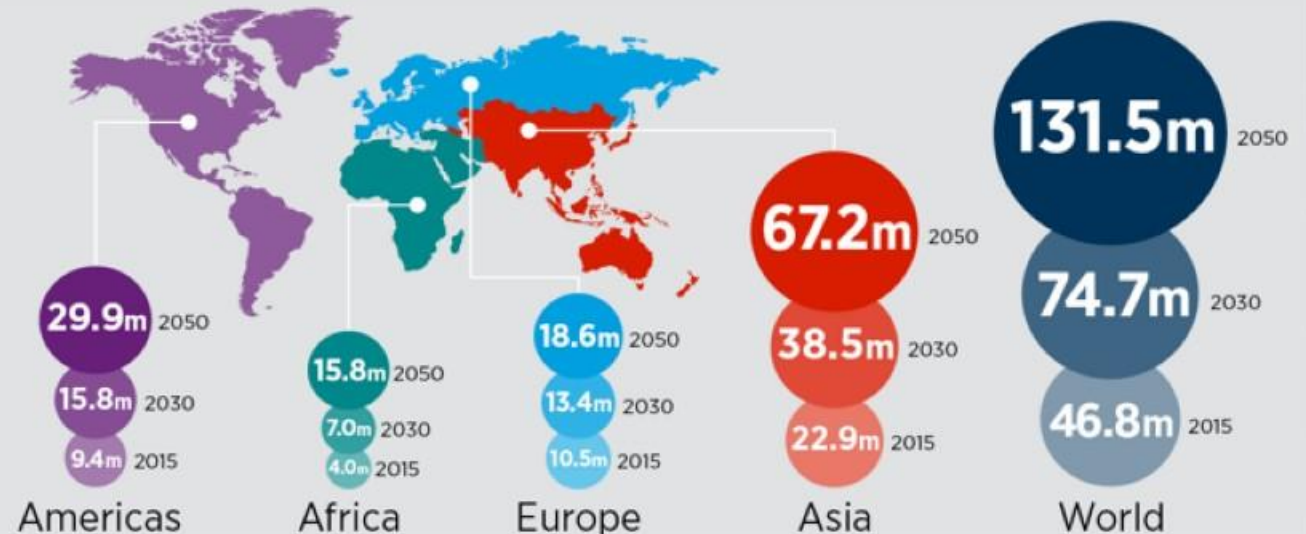


(Male vs. Female)



- AD is the leading cause of dementia and the sixth most common cause of death in the US.
- Incidence and prevalence increase with age.
- Incidence
 - ~ 400:100,000 in individuals between 65 and 74 years of age
 - ~ 3200:100,000 in individuals 75–84 years of age
 - ~ 7600:100,000 in individuals ≥ 85 years of age

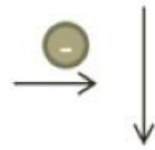
People living with dementia around the world



ALZHEIMER'S BIOCHEMISTRY

Amyloid Precursor Protein (APP)
(on neurons)

Apolipoprotein E (ApoE)
Epsilon 2 Allele



Apolipoprotein E (ApoE)
Epsilon 4 Allele

Beta Breakdown Product
(cleavage)

Alpha-Beta (AB) Amyloid



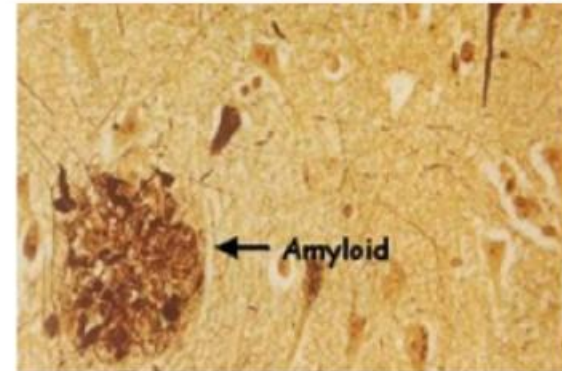
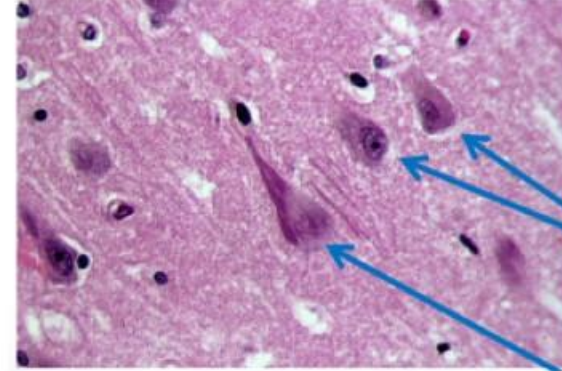
CNS Buildup

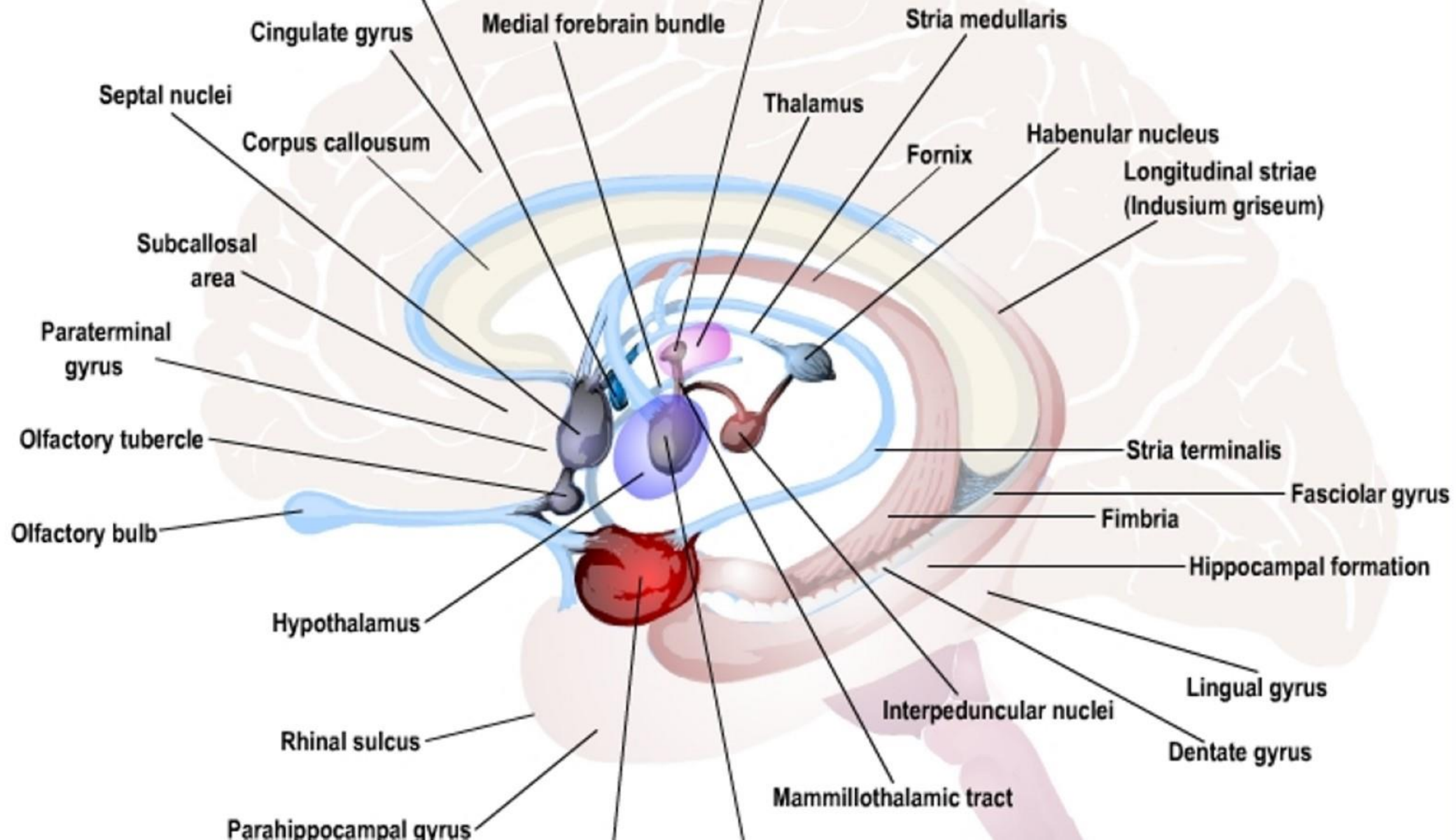
Alzheimer's

Healthy
Brain

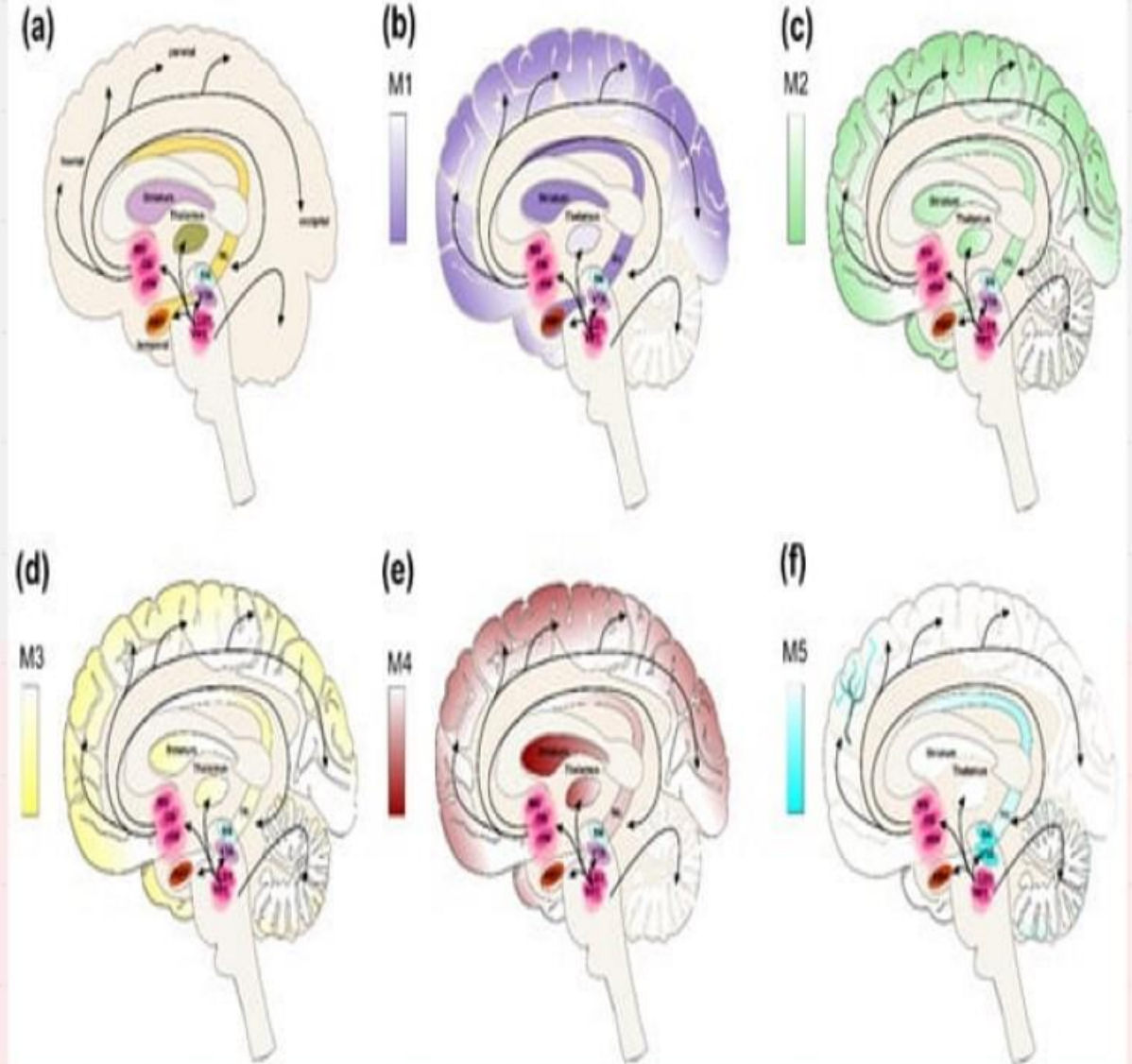
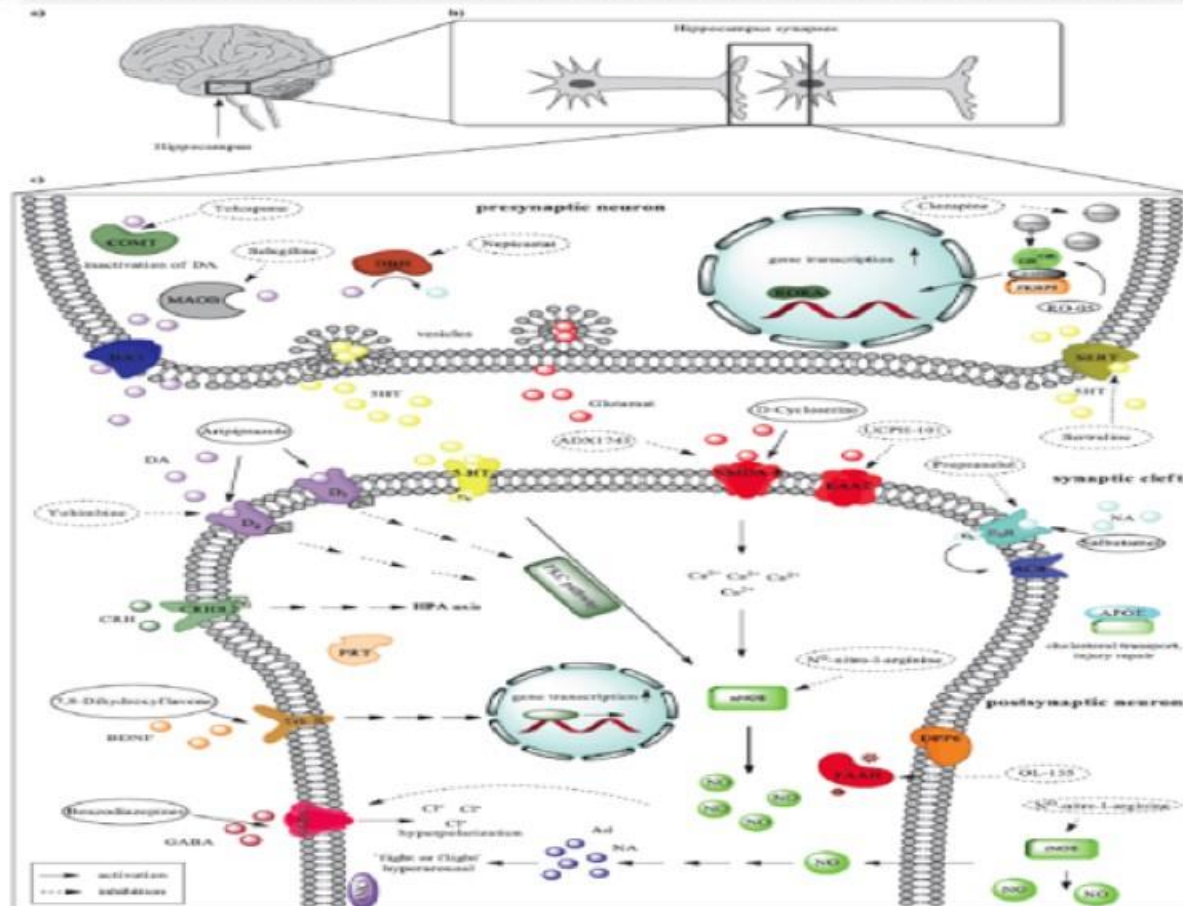


Severe
AD





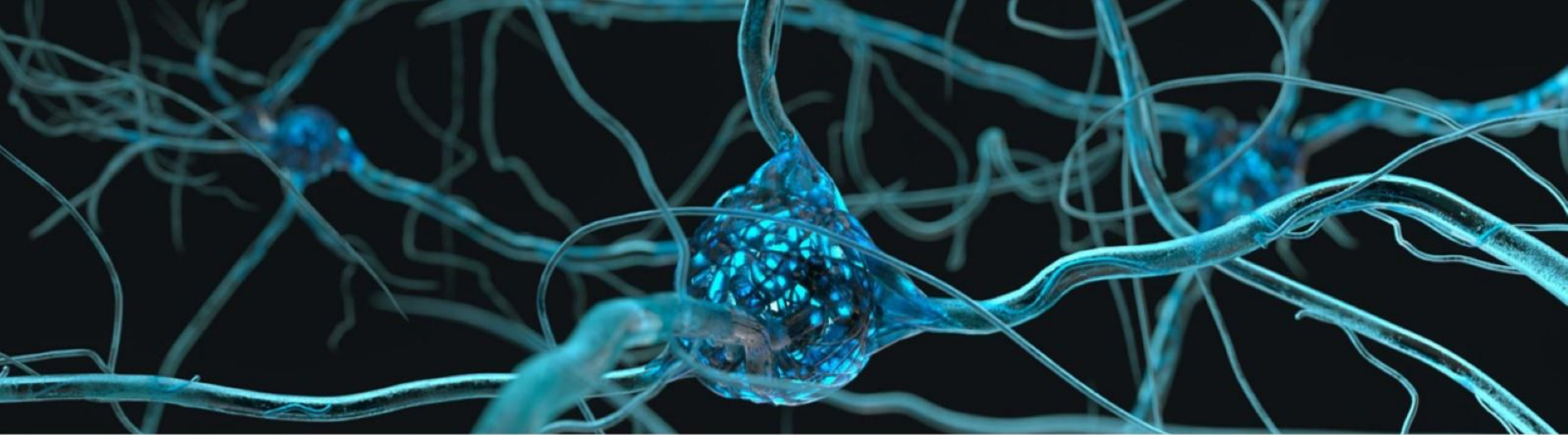
HIPPOCAMPUS NEURONAL RECEPTORS



SYMPTOMS

1. Patient may not notice cognitive decline
2. Often brought in by family member
3. Diagnosis: clinical
4. Confirmed at autopsy

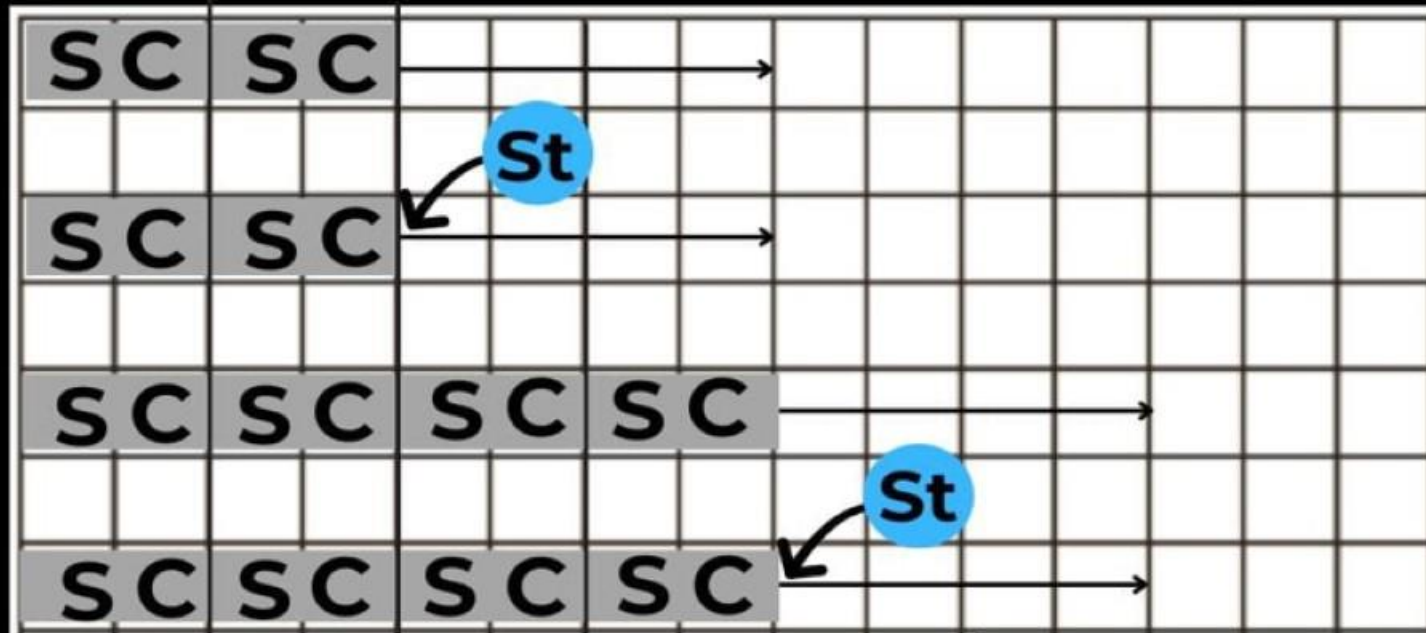




PURPOSE OF STUDY

- **To compare the RNA content in the cytoplasm of rat hippocampal neurons to assess the activity of intracellular regeneration when modeling Alzheimer's disease and introducing stem cells**

MATERIAL AND METHOD

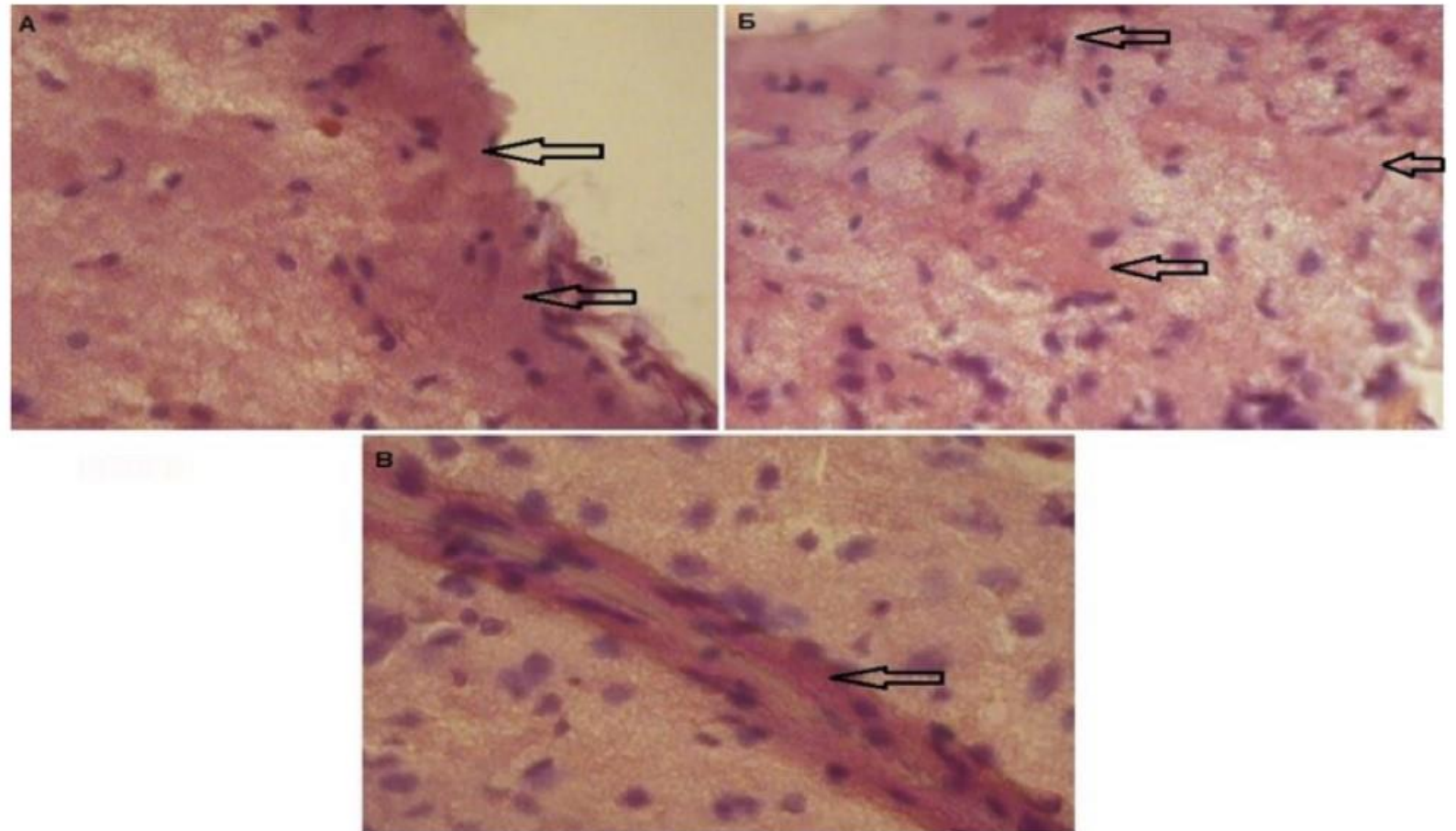


MATERIAL

- The brains of animals (**5 animals from each group**) were fixed in a 4% neutral formaldehyde solution.
- After paraffin embedding, sections 4-5 μm thick are stained **with gallocyanine-chromium alum according to Einarson for total nucleic acids.**
- The **optical density of the cytoplasm of neurons in the pyramidal layer** of the hippocampus in the CA1 field was determined.
- Digital data processed by the statistical method according to **Student and Mann-Whitney Test.**

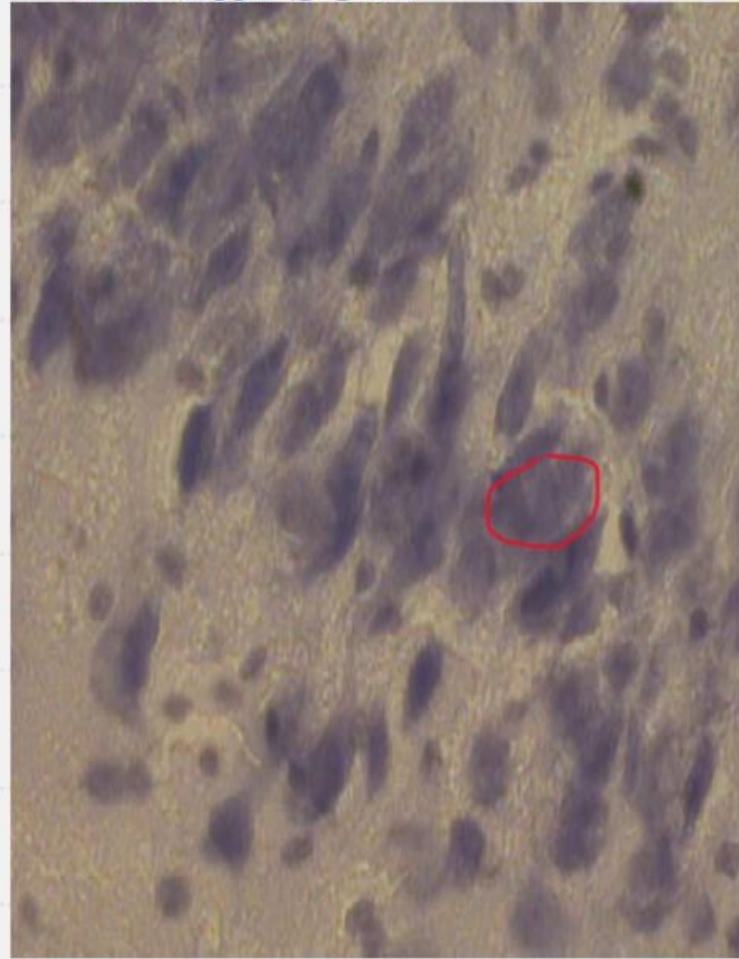
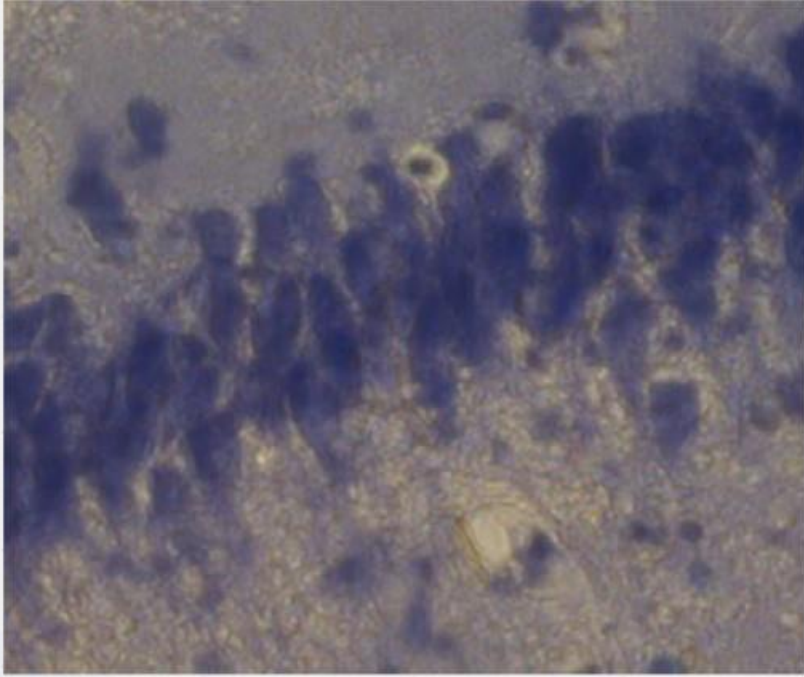
Scopolamine Model: Congophilic Mass (Amyloid) in The White Substance of The Brain. 400x

RESULTS:

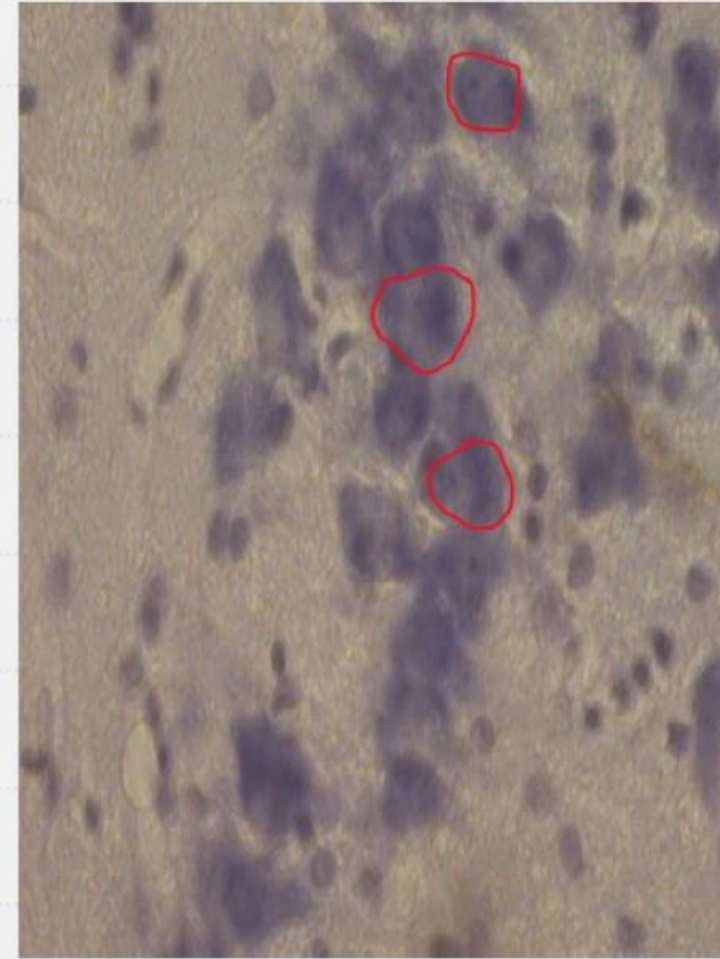


Microspecimen From The Hippocampal Neurons With Gallocyanine-Chromium Alum According to Einarson

- CONTROL GROUP



SC2

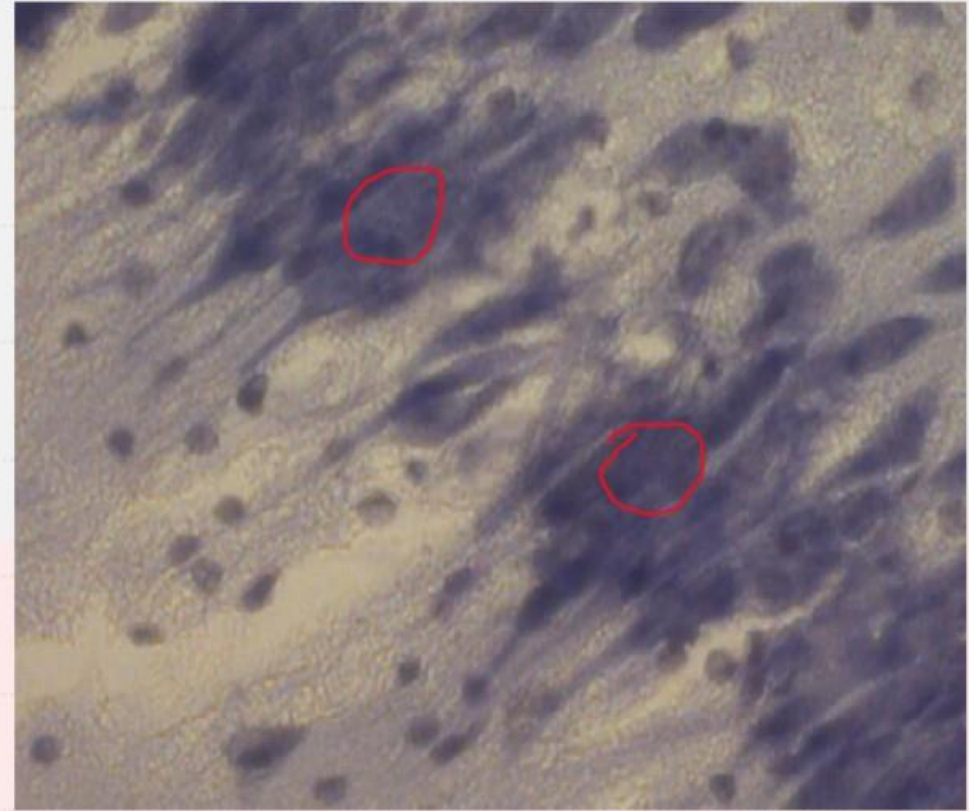


SC2-ST

Microspecimen From The Hippocampal Neurons With Gallocyanine-Chromium Alum According to Einarson



SC4



SC4-ST

CONCLUSION

- A comparison of the cytological and morphometric features of hippocampal neurons in different groups suggests that when the duration of the course of scopolamine injections increases from 2 weeks to 4 weeks, the ability of stem cells to enhance intracellular regeneration in neurons sharply decreases. Overall, these results provide valuable insights into the effects of stem cell therapy on hippocampal neuron morphology and intracellular dynamics, highlighting its potential as a therapeutic intervention for neurodegenerative diseases.



Thank You For
Your Attention

