



Exploring The Therapeutic Potential Of Papain On Scopolamine Model Of Dementia In Wistar Rats



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INTRODUCTION

CCAAT/enhancer-binding-protein beta (C/EBP β) is a master transcription factor that orchestrates the "vicious cycle" of inflammation and protein misfolding (Luo et al., 2025). An upregulation of C/EBP β results in microglial activation and its transcriptional control over proinflammatory cytokines (IL-1 β , TNF- α) during Alzheimer's and Parkinson's disease progression (Luo et al., 2025). Papain is a proteolytic enzyme derived from papaya latex, and possesses a strong biochemical stability and antioxidant potential, making it a compelling candidate for neuroprotection. There is a dearth of scientific information on the role of papain on scopolamine-induced dementia through the C/EBP β -inflammasome axis. Hence, this study aims to explore the therapeutic potential of papain on this pathway.

RESULTS

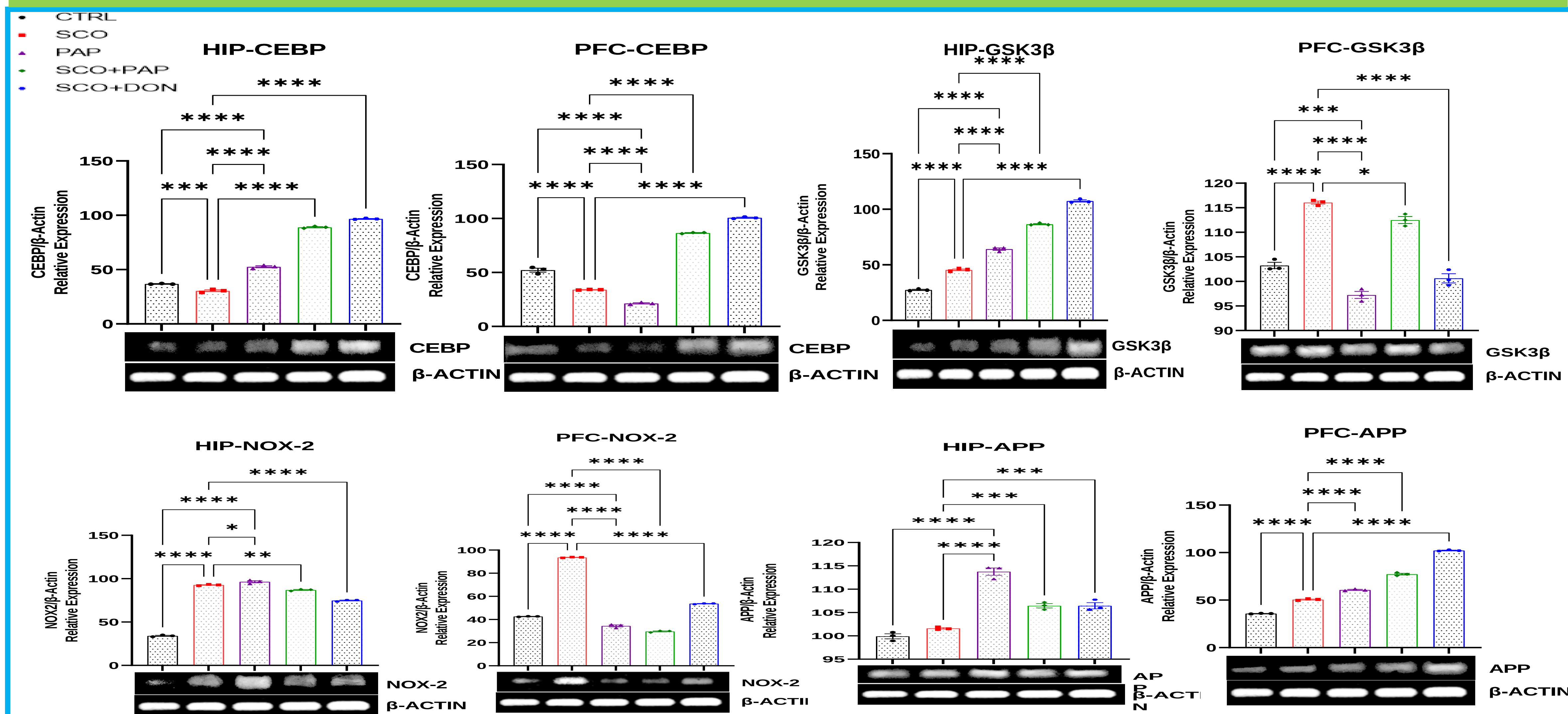
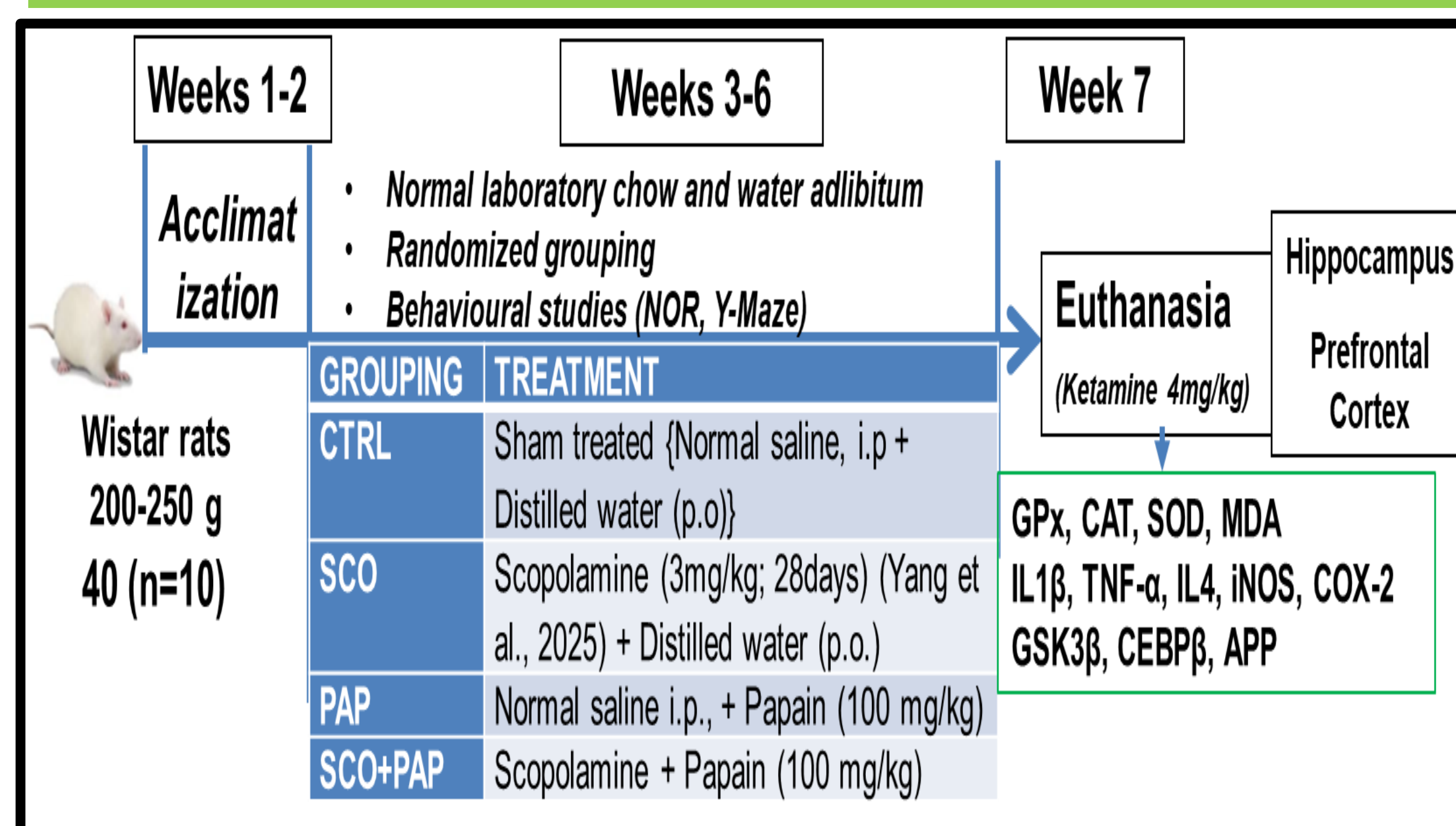


FIG 2: PCR techniques showing the levels of CEBP/B, GSK3 β , NOX-2, and APP expressions in the hippocampus (HIP) and prefrontal cortex (PFC). Where * shows the different levels of significance using the pairwise comparison bars

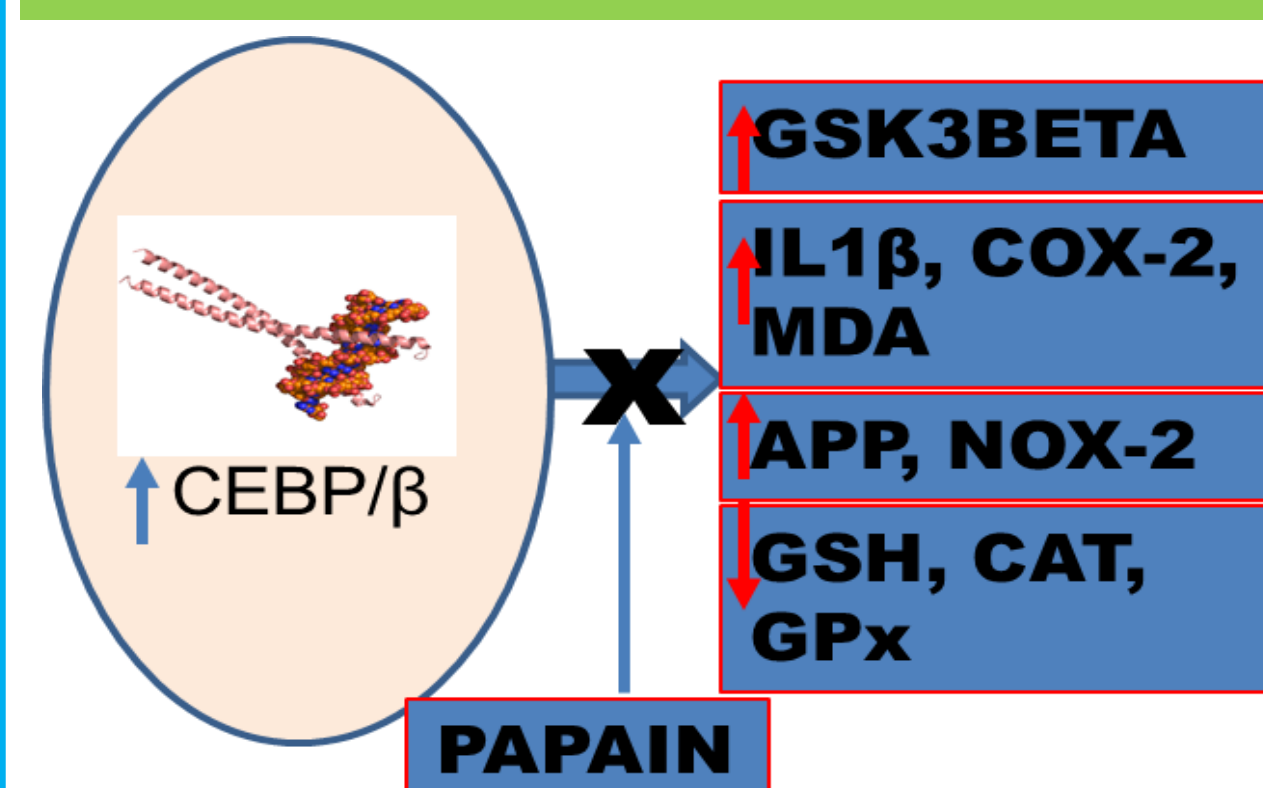
EXPERIMENTAL DESIGN



BIOCHEMICAL PARAMETERS (HIPPOCAMPUS)	CTRL	SCO	PAP	SCO+PAP	SCO+DON
SOD	0.06±0.007	0.03±0.004*	0.06±0.005 α	0.06±0.004 α	0.06±0.007 α
GPx	272.9±28.56	170.8± 13.72*	239±16.98* α	212.1±8.99* α	222.5±7.124 α
CATALASE	19.95±0.91	8.175±0.71*	17.05±1.39* α	14.06±1.25* α	14.97±0.98* α
IL1 β	63.35±5.91	145±6.38*	86.12±7.94* α	108.7±6.32* α	134±5.58*
IL4	88.14±6.12	69.03±3.60*	131.5±5.71* α	100.3±4.27 α	125.2±11.92* α
COX-2	107.6±3.16	115.4±3.16*	103.6±4.90 α	116.9±2.90*	103±4.50 α
MDA	0.88±0.09	1.43±0.08*	0.85±0.08 α	0.93±0.05 α	0.9±0.04 α

Table showing the ELISA Concentrations of some markers in the hippocampal homogenates. * means significantly different from CTRL, and α signifies significant from SCO

SUMMARY/CONCLUSION



In conclusion, Scopolamine triggers the CEBPBETA signaling through the GSK3 β pathway. However, Papain was able to arrest this effect to a great extent almost to the control level. This implies that Papain could be targeted as an inflammatory therapeutic agent in the management of dementia symptoms, although, more research needs to be done in order to explore its major mechanistic pathway .

REFERENCES

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- Yang, Z., Zhang, F. R., Ren, L., Bai, J. M., Wang, S. C., Li, X. Y., ... & Xiao, H. H. (2025). Multi-omics reveal the neuroprotective mechanisms of Xinshubao tablet against scopolamine-induced cognitive dysfunction in mice. *Frontiers in Pharmacology*, 16, 1596728.

RESULTS

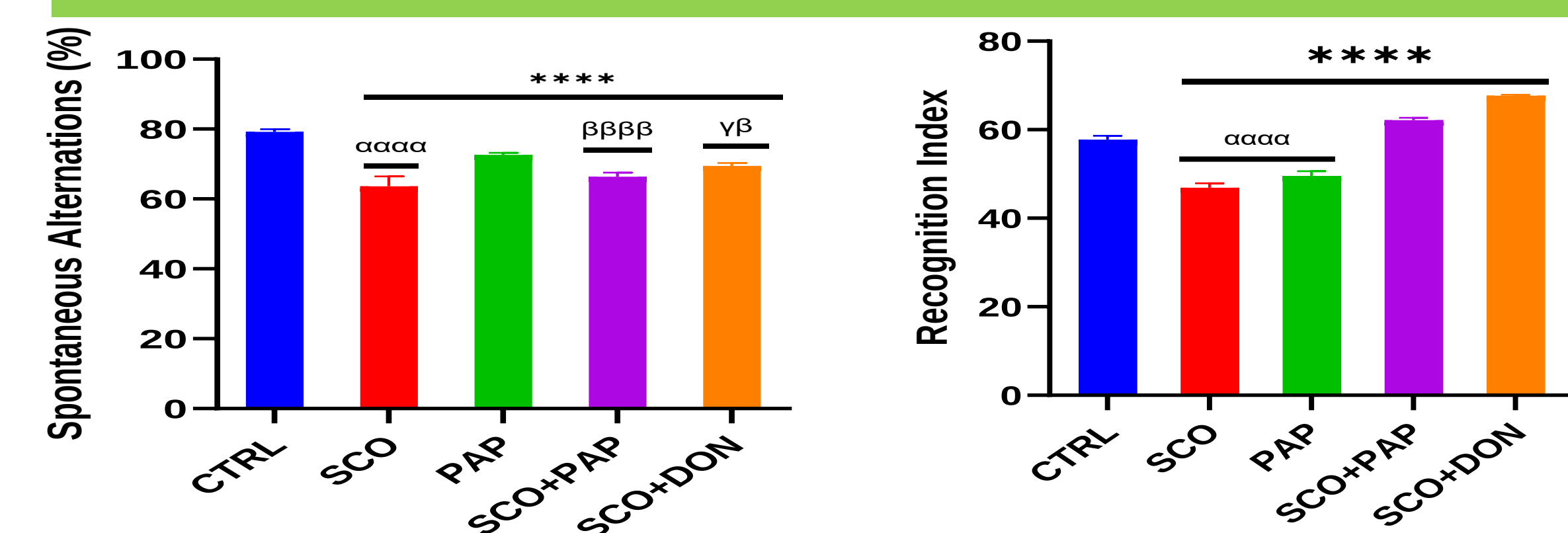


Fig 1: Spontaneous alternations and Recognition index in rats after treatment. * means significant from CTRL, α sig from all groups, β sig diff from PAP, γ sig from SCO+PAP