



# Isoflavones neuroprotective effect offspring of dams exposed to chronic unpredictable mild stress (CUMS)

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## INTRODUCTION

Gestational stress causes changes in organization, plasticity, and adaptation during fetal development in mammals, considered an insult to development that alters critical periods of central nervous system development. Stress during pregnancy increases the concentration of glucocorticoids and cytokines, since these can cross the placental barrier, and the fetus can also be affected by stress; it has also been linked to a higher incidence of psychiatric disorders in humans, such as Alzheimer's disease. On the other hand, gestational stress produces changes in the hypothalamus-pituitary-adrenal axis, alterations in neuronal development in the hippocampus, and cognitive deficits. Nowadays, the properties of isoflavones have been investigated due to their antioxidant properties, in addition to being a substantial part of the human diet. These plant proteins known as phytohormones, with a structure like 17 $\beta$ -estradiol (E2), can act as selective estrogen receptor modulators (SERMs). Furthermore, depending on the dose, they may have neuroprotective qualities like those naturally present in E2 during pregnancy. The present study aims to evaluate the effects of isoflavones on early development and the learning and memory process in children of mothers exposed to chronic unpredictable mild stress (CUMS).

## METHODS

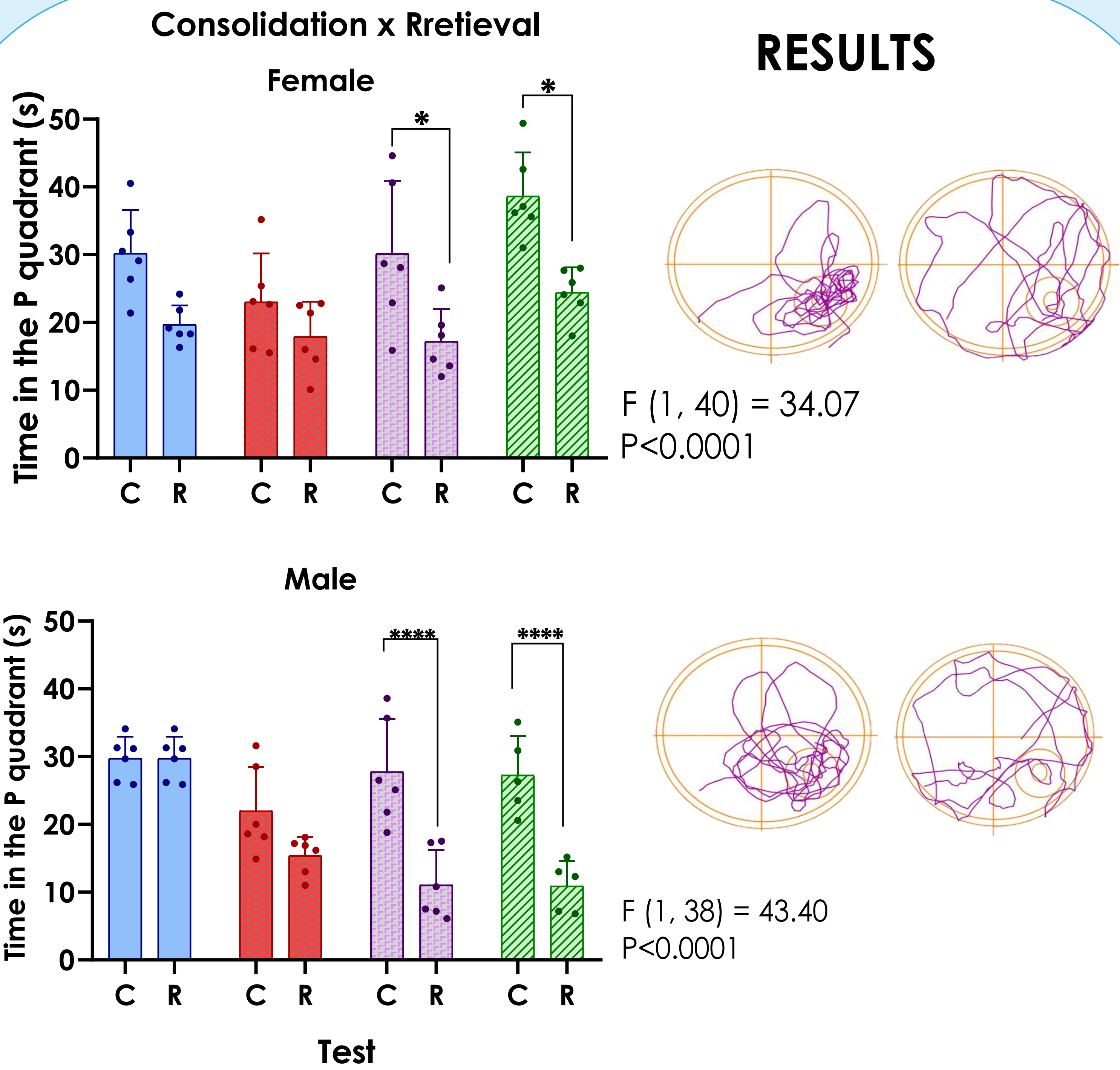
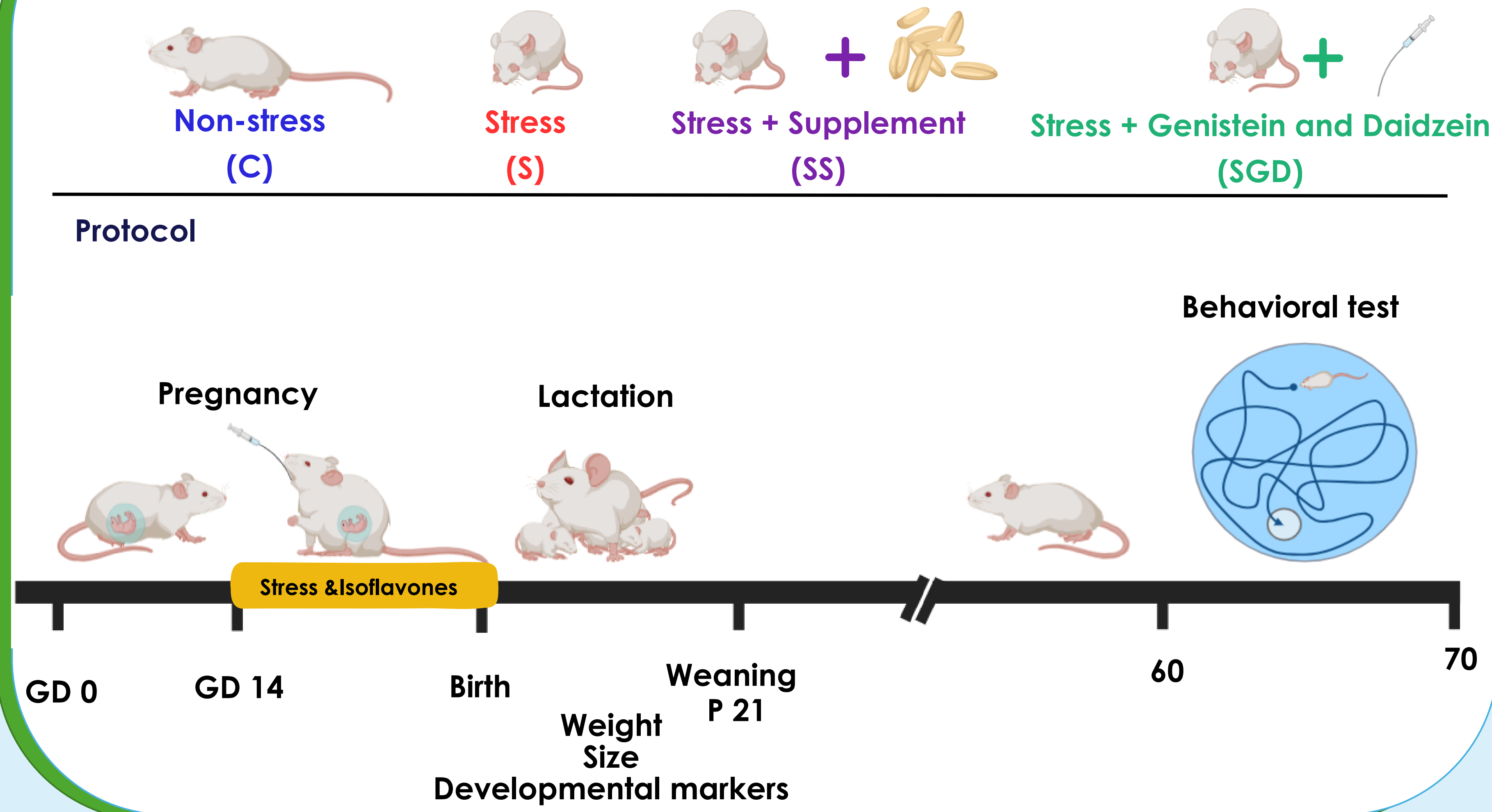


Fig 1. Time in the P quadrant in the consolidation and retrieval in memory test at 60 days of age in both sexes. C (blue), S (red), SS (purple), SGD (green) n = 8, Show representative behavioral responses in Morris Maze test \* p<0.05.

	C	S	SS	SGD
Measure	Average age (days)			
Eyes opening	17 ± 1	17 ± 0	18 ± 2	17 ± 1
Pinna detachment	15 ± 1	16 ± 2	16 ± 1	15 ± 2
Fur development	16 ± 2	16 ± 1	15 ± 4	16 ± 4
Incisor eruption	10 ± 1	13 ± 1	11 ± 2	13 ± 1
Vaginal opening	38 ± 4	42 ± 5	41 ± 4	37 ± 4
Testicular descent	27 ± 2	30 ± 4	29 ± 2	28 ± 1

## RESULTS

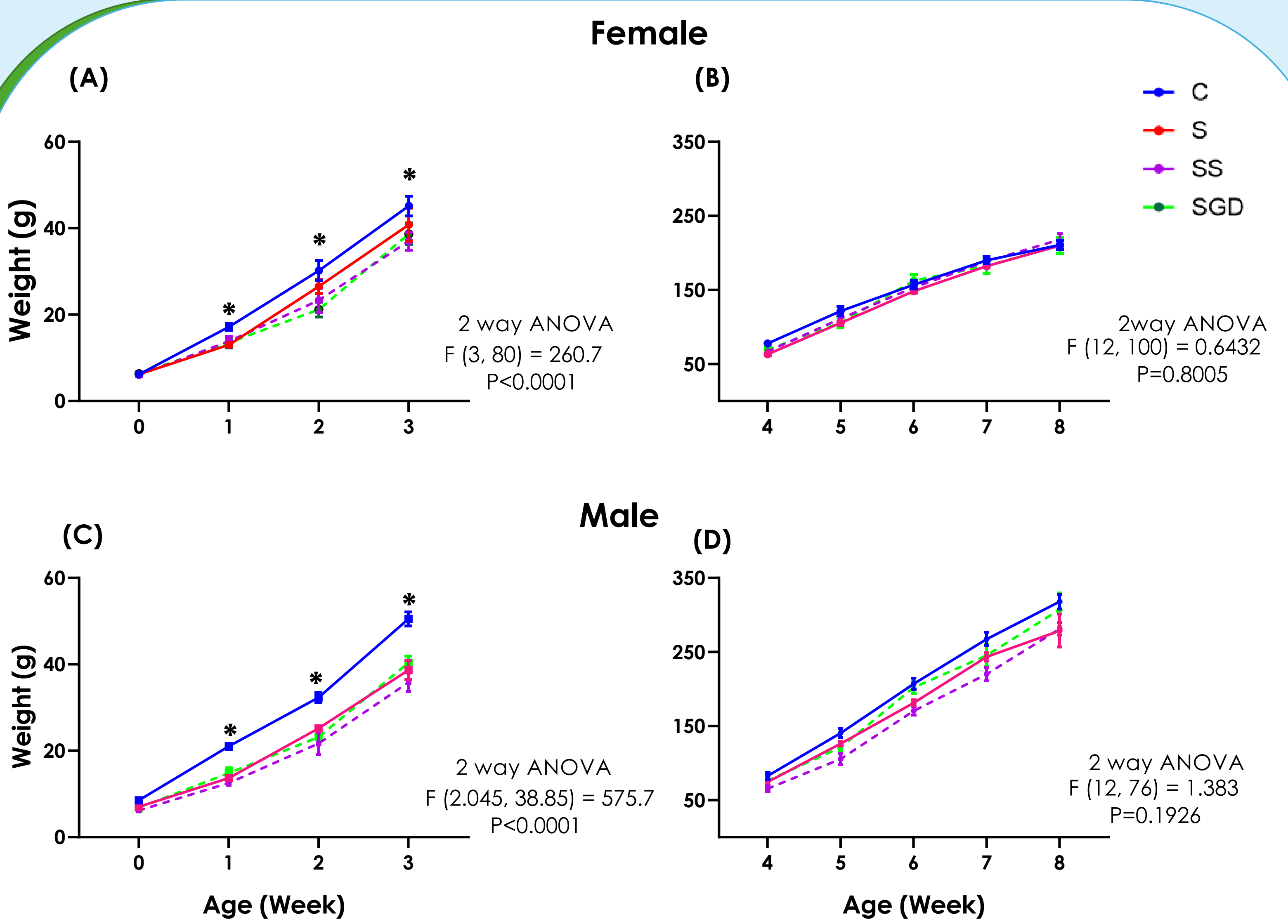


Fig 3. Grow curves from birth to 60 days of age. Female C (blue), Female S (red), Female SS (purple), Female SGD (green) n = 6, Male C (blue), Male S (red), Male SS (purple), Male SGD (green), n = 6, Means ± standard deviation, \* p<0.05.

## DISSCUSION AND CONCLUSION

The results show that SS and SGD females and males exhibit lower weight gain and a delay in the appearance of early developmental markers compared to the control and stress groups. Learning and memory tests showed that females in the SS group had lower retention compared to those in the C and S groups. While males in the SGD and SS groups had lower retention than those in the C and S groups. Therefore, the administration of isoflavones during the third week of pregnancy has a neuroprotective effect on development, memory, and, learning processes.

## Acknowledgements



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