

A Hypothesized role of uncharacterized gene CG 10809 in Parkinson disease and Neurodegeneration



Abstract:

This paper will look at different resources that implicate the function of the CG10809 unknown gene and design an experiment to verify or falsify the hypothesis. Given the evidence and information presented in the databases, we predicted that the CG10809 is a calcium ion transport channel protein that is part of the nuclear pore complex



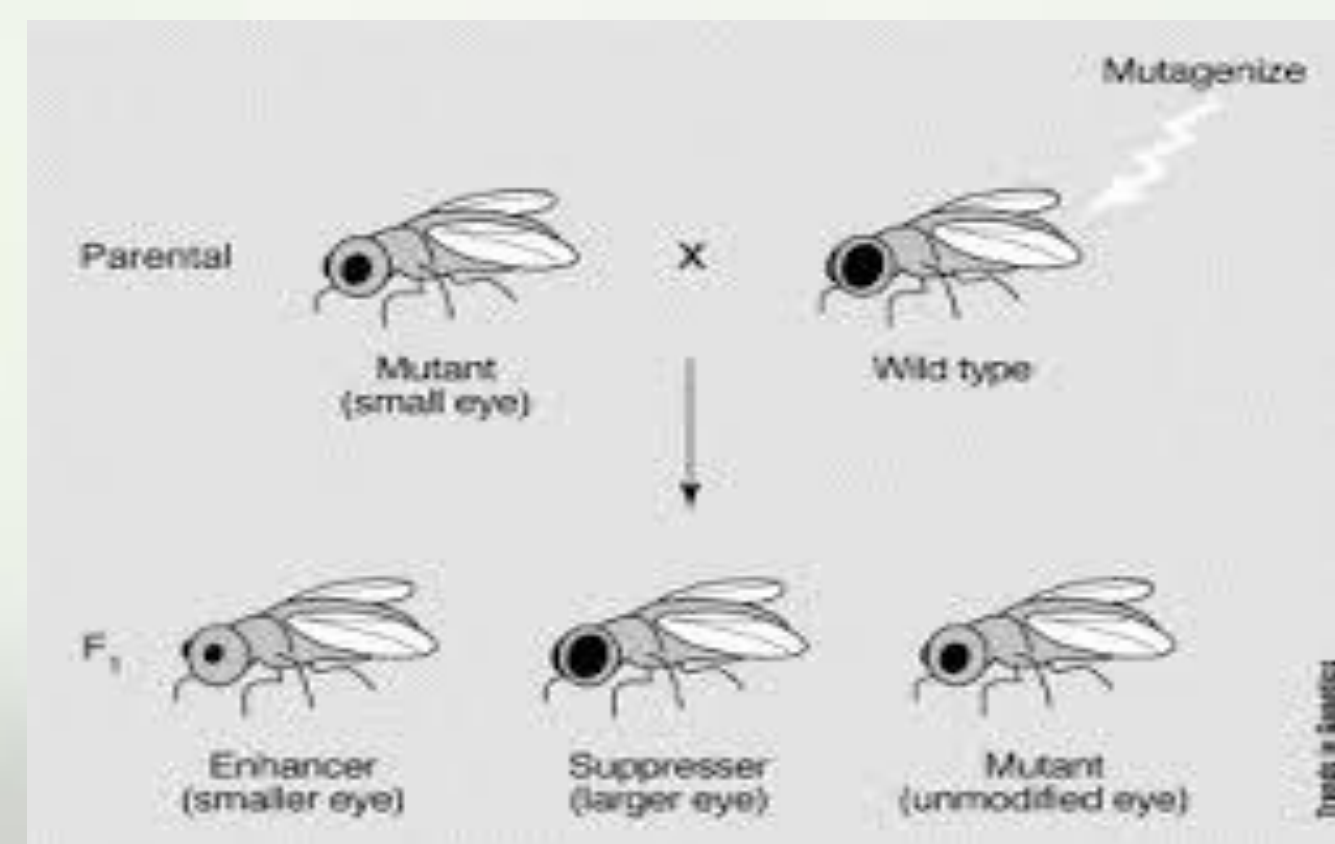
Introduction:

- ❖ The fruit fly is a good model organism for human disease homologues including Parkinson disease (PD). Parkinson disease is a neurological disorder in which it includes the degeneration of neurons cells.
- ❖ A Research conducted by Marcogliese et al. focuses on a modifier screen involving a mutated form of Leucine rich repeat kinase 2 (LRRK2) gene (2017). Marcogliese et al used this LRRK2 gene in their modifier screen to expose some key players genes in the progression of Parkinson disease. LRRK2 is commonly mutated in up to 42% of familial linked PD.



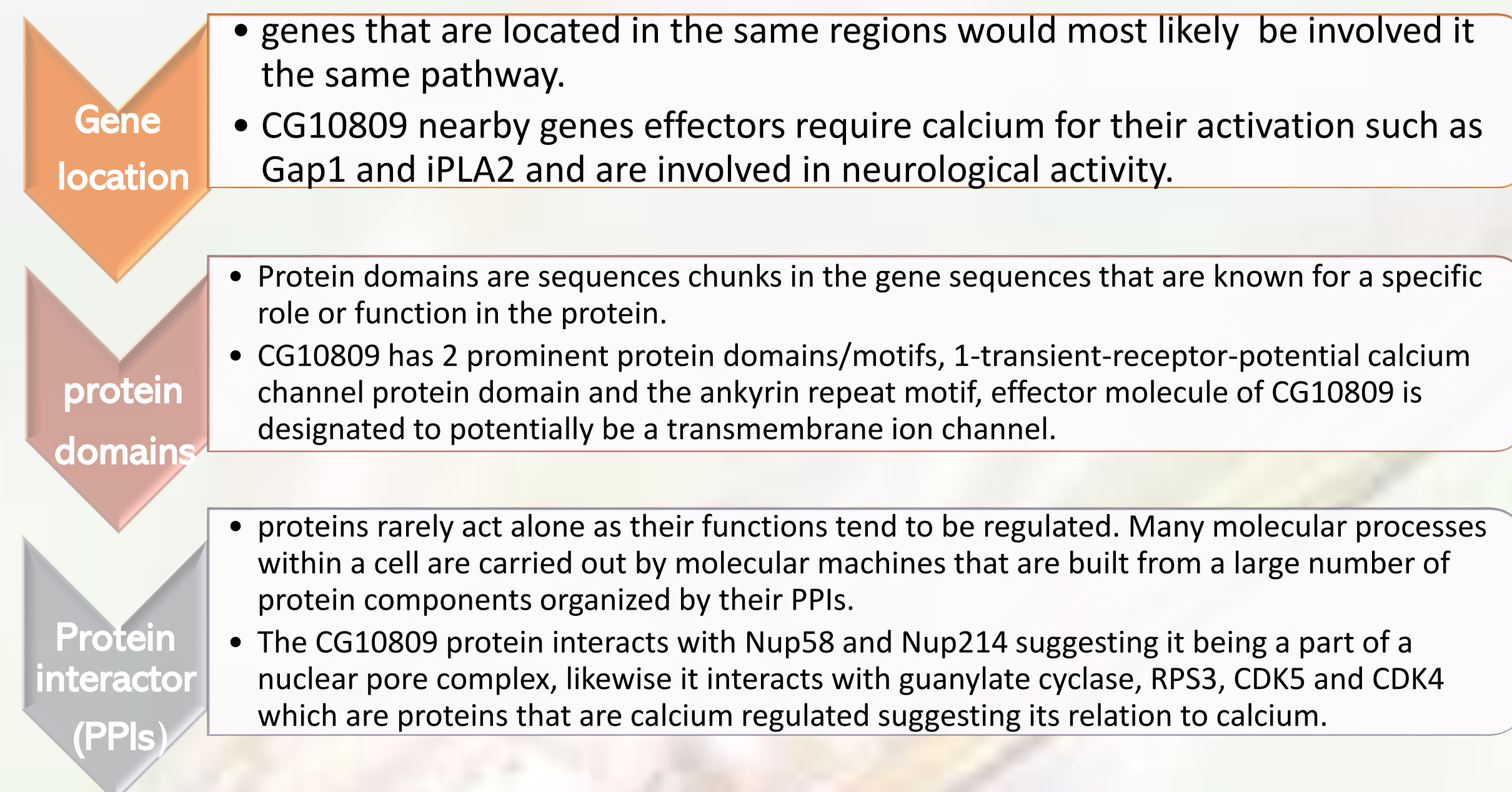
Modifier screen:

Marcogliese et al utilized a GAL4-UAS system to conduct both an enhancer and suppressor screen in the eye cells of *d. melanogaster*. The GAL4-UAS system allows for over expression or under expression of chosen genes and study the resulting effect. One of these modifier proteins, CG10809, suppresses the phenotype, when it is over-expressed alongside LRRK2 loss-of-function mutations it causes rescue of the cell (Marcogliese et al. 2017).

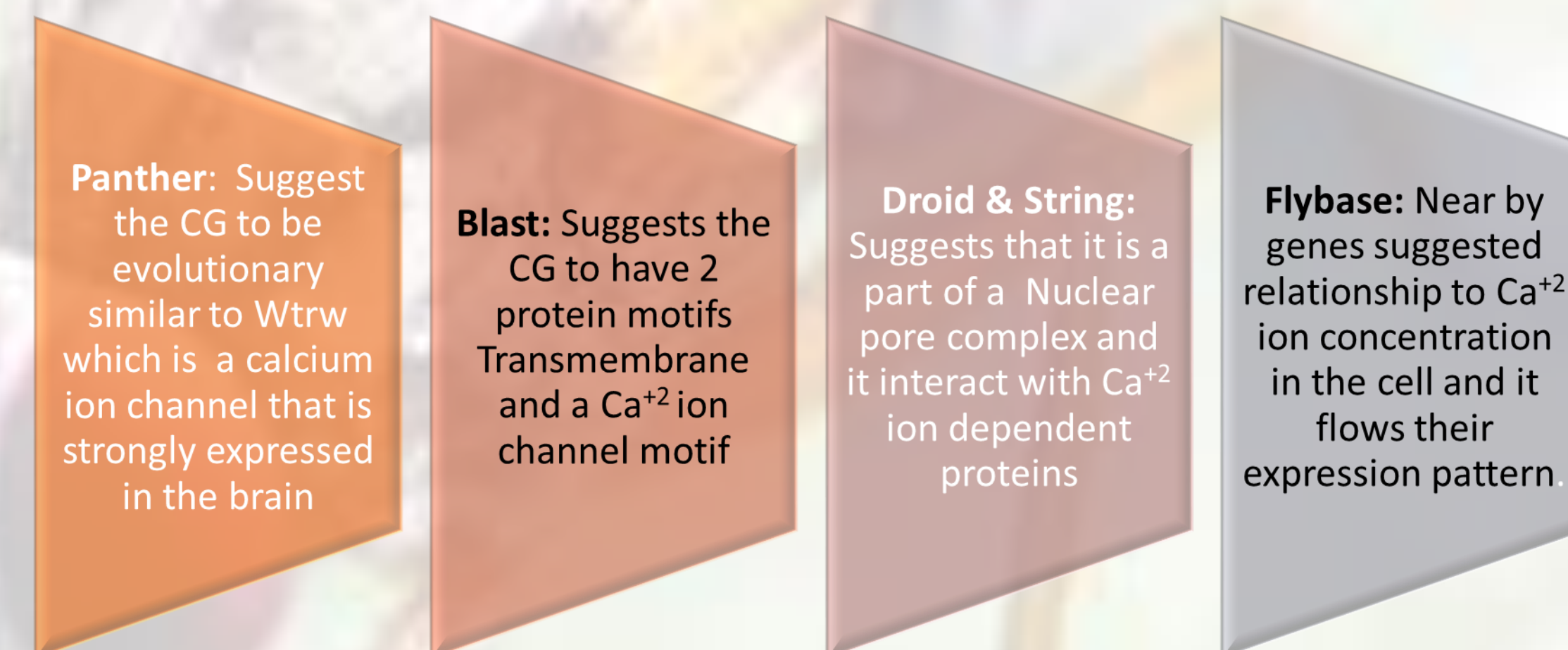


Methodology:

Our analysis for predicting the function of CG10809 involved the utilization of three main approaches:



Evidence from the following Database:



What does this mean?

- ❖ the CG10809 is a calcium ion transport channel protein that is part of the nuclear pore complex.
- ❖ The Nuclear pore complex is a large macromolecular complex consisting of eight ion channels and a large central passage. The nuclear lumen, which is contiguous with the ER lumen, is also acting as a calcium storage chamber for cells. Calcium is an important signal transduction molecule Some of the physiological roles that calcium plays are neurological roles. One important neurological role played by Ca²⁺ ion is neurogenesis.
- ❖ Thus CG10809 contribute to the regulation of calcium concentration in the cytoplasm of the cell playing an evident neurological role in an organism.



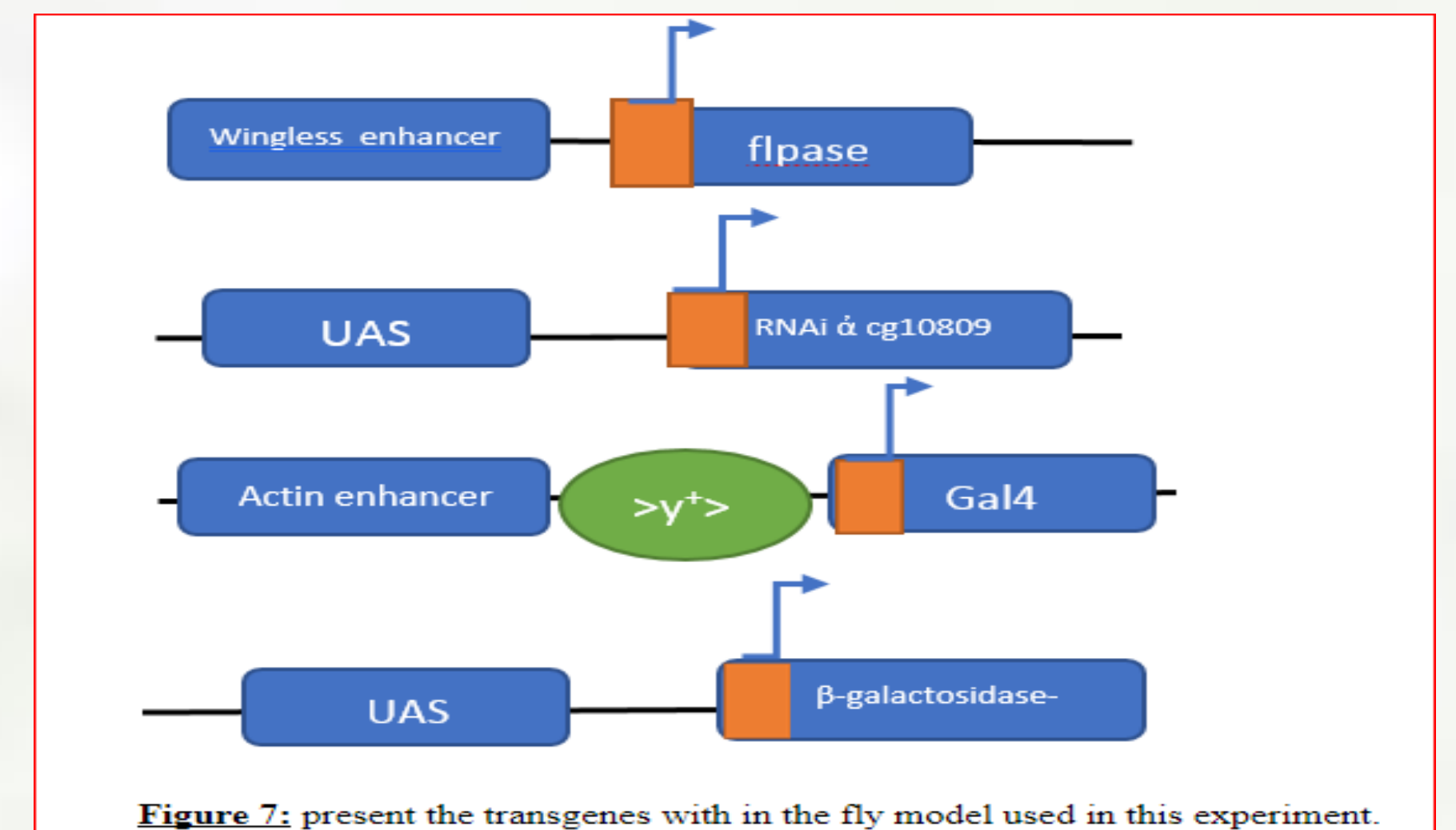
Conclusion:

How Does the CG function relate to the article?
 Marcogliese et al study showed that the overexpression of CG10809 resulted in suppressed neurodegeneration phenotype. If the prediction above is correspond with the results of this paper, an overexpression of calcium ion channel would lead to suppression of neurodegeneration since calcium concentration levels in the cell are positively regulated encouraging cell growth and inhibiting apoptosis.



Experiment:

- 1) Measuring the change in permeability of NPC using UAS/GAL4 Binary system coupled with Fura-2 Imaging For Calcium detection.
- ❖ The experiment fly model:



- ❖ The effect will be observed in the imaginal disk.
- Stock for this experiment:
- ❖ Flpase (BDSC1313)
 - ❖ Gal4 (BDSC 4409)
 - ❖ β -Galactosidase (BDSC 4409)
 - ❖ RNAi (v38408)

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