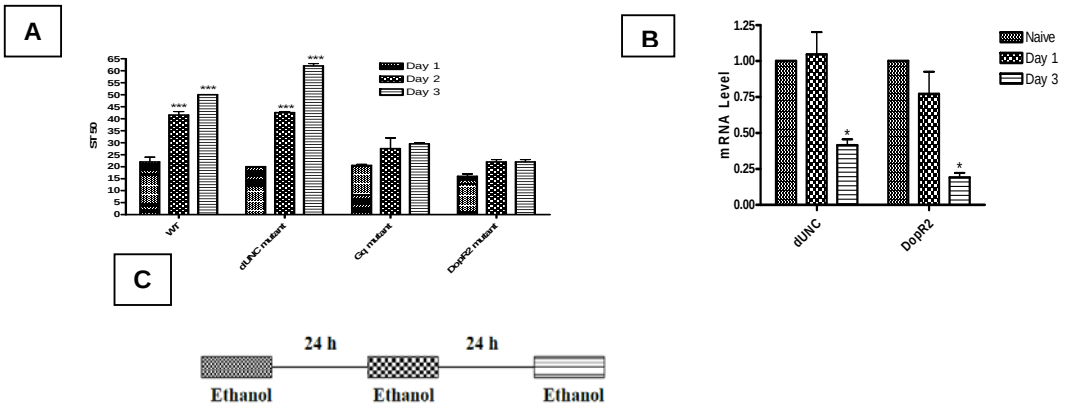
The Role of G Protein In Alcohol Related Behaviours Using *Drosophila melanogaster* As A Model

Ethanol, classified as a drug, affects the central nervous system, and its consumption has been linked to the development of several behaviours including tolerance and dependence. Alcohol tolerance is defined as the need for higher doses of alcohol to induce the same changes observed in the initial exposure or where repetitive exposures of the same alcohol dose induce a lower response. Ethanol has been shown to interact with numerous targets and ultimately influence both short and long term adaptation at the cellular and molecular level in brain [1]. These adaptation processes are likely to involve signalling molecules: our work has focussed on G proteins gene expression. Using both wild type and several mutant fruit fly (*Drosophila melanogaster*) as a model for behaviour and molecular studies, we observed significant increases in sedation time (ST50) in response to alcohol *(P<0.001)* Fig.A. We also observed a consistent and significant decrease of Gq protein mRNA expression in *Drosophila* dUNC and DopR2 mutants chronically exposed to alcohol (**P<0.05*). Fig B.

Method: Six male flies were observed in drosophila polystyrene 25 x 95mm transparent vial in between cotton plugs. To the top plug, 500uL of 100% ethanol was added. Time till 50% of the flies were sedated was recorded on each day following the schedule. Fig. C (*n*=4-6). Using RT-PCR, we also quantified G protein mRNA expression levels one hour post initial 30 minutes of ethanol expression on day 1 and day 3 relative to expression in naïve flies.(*n*=2)



[**A] Increase in sedation time indicative of tolerance in different mutant lines and wild type flies. Six male flies were used in each experiment and (*n*= 4-6. ***P<0.001 unpaired *t* tests). [B] RT-PCR results showing significant reduction in Gq mRNA in flies chronically exposed to alcohol. (*n*=2. *P<0.05) [C] Alcohol exposure schedule.**

(1) Kaun K.R., R. Azanchi, Z. Maung, J. Hirsh, U. Heberlein. (2011). A Drosophila model for alcohol reward. Nature Neuroscience. 14 (5), 612–619.