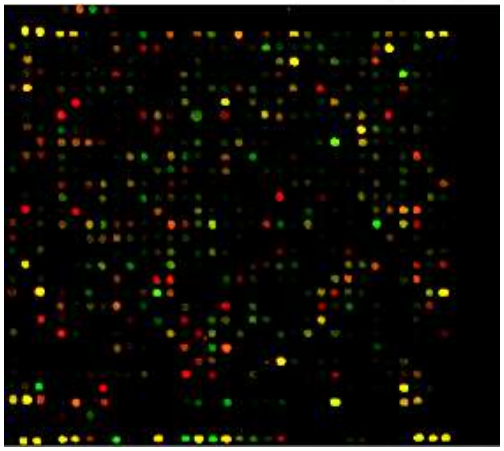
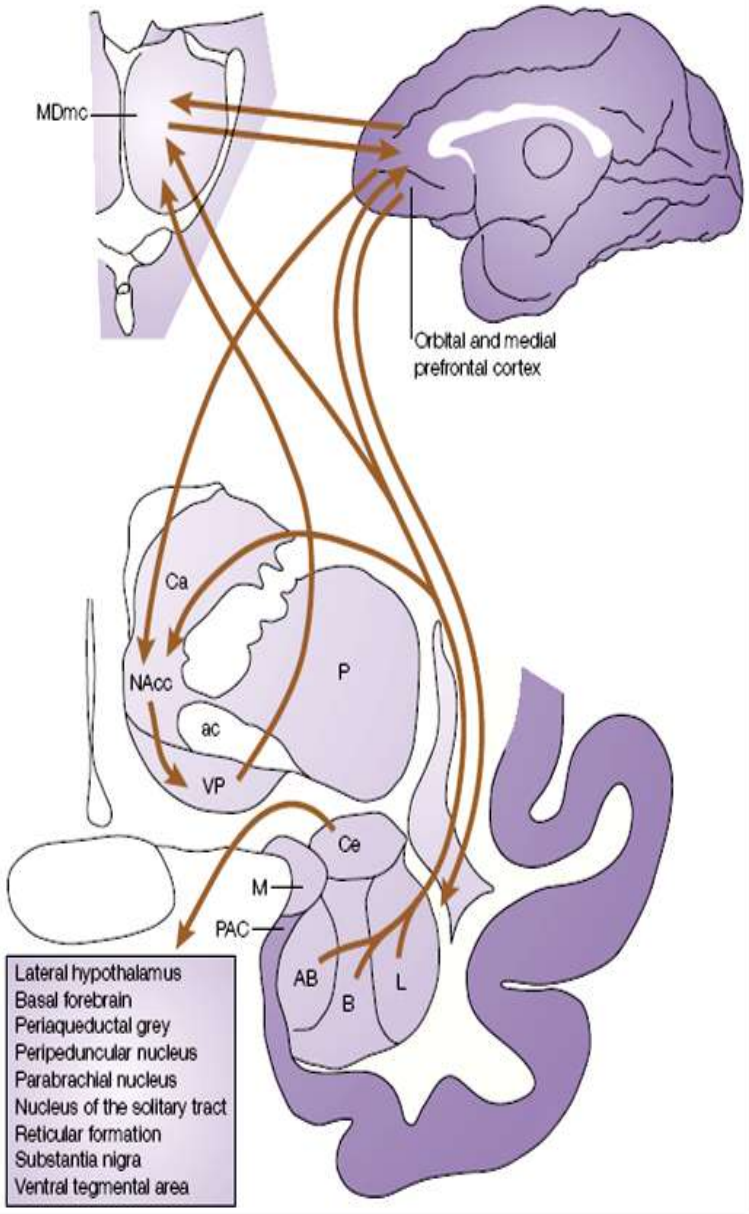
Odor and Taste Hedonics in the Treatment of Nausea?

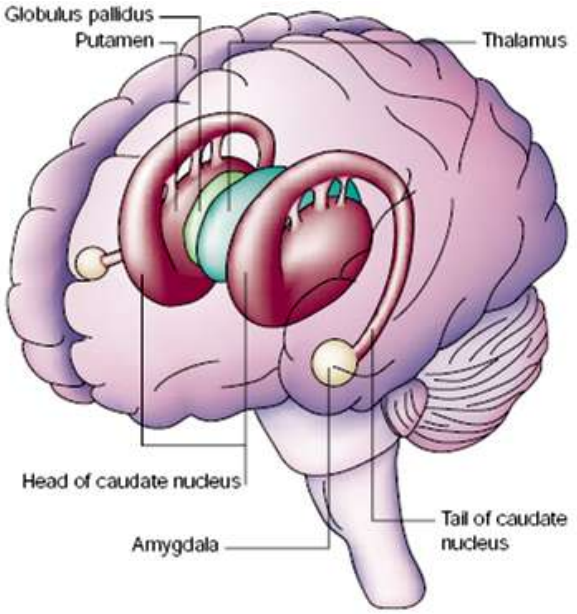
Arun Chaudhury, MD

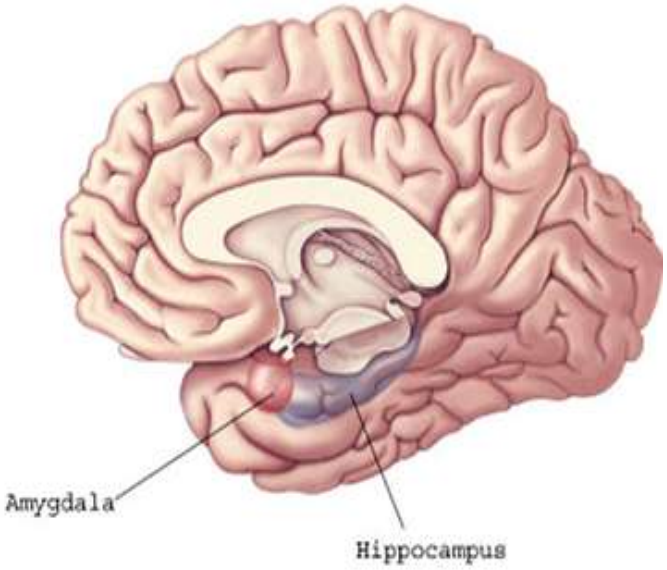
Global gene expression patterns in brain in response to nauseating drugs



What is the region of interest?







High-throughput microarray detection of gene expression in amygdala in response to cisplatin

- Drug treatment
- Sample preparation & Affymetrix RAE 230 2.0 hybridization
- Data analysis

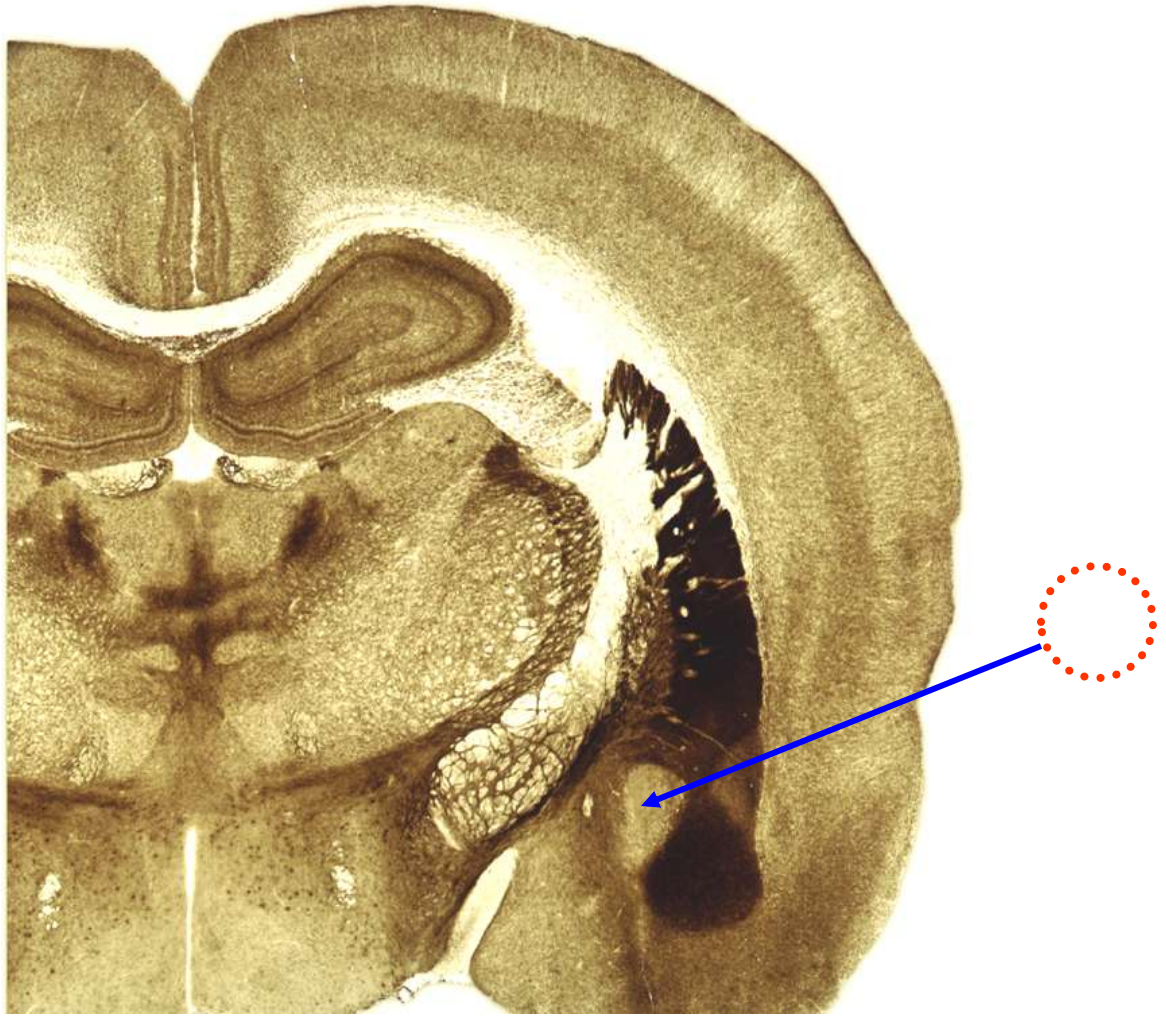
Design of the MicroArray Experiment

Cisplatin ip

10 mg/kg/ml

24 hrs

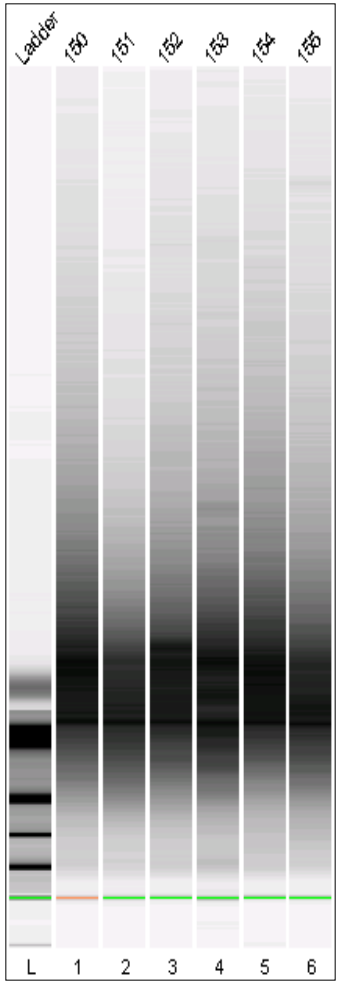
Saline ip



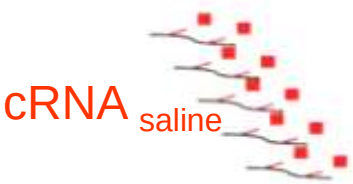
Paxinos & Watson

Basics of MicroArray steps

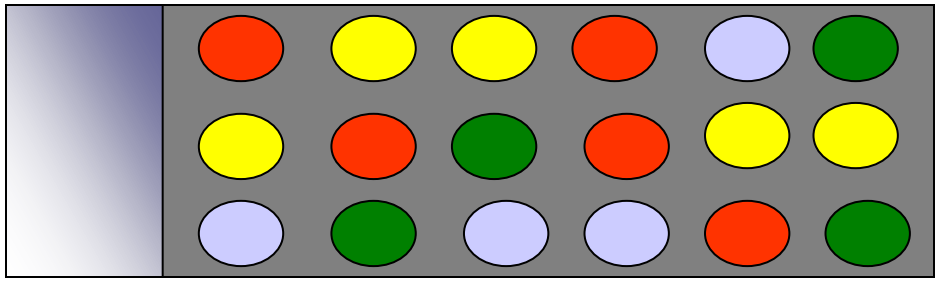
mRNA Nanoassay

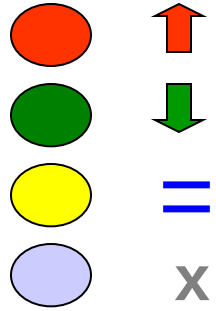


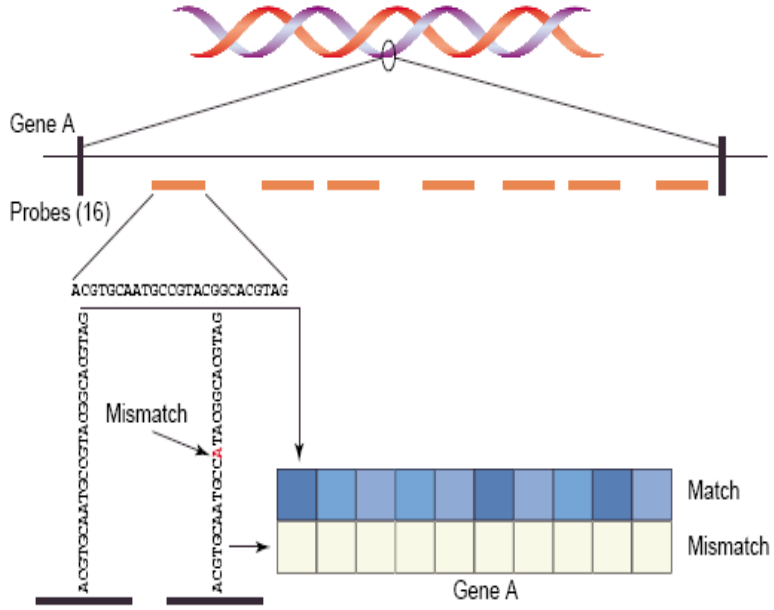
$OD_{260/280}$ > 1.9

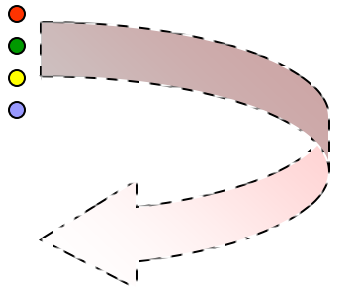


Affymetrix RAE 230 2.0

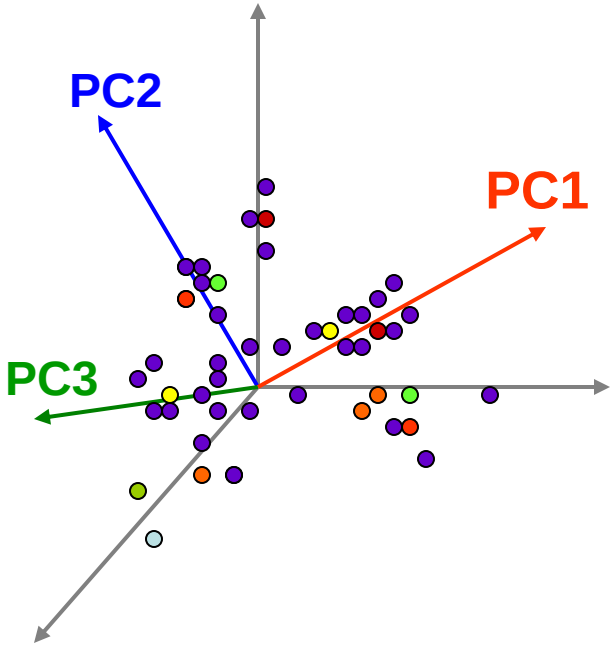


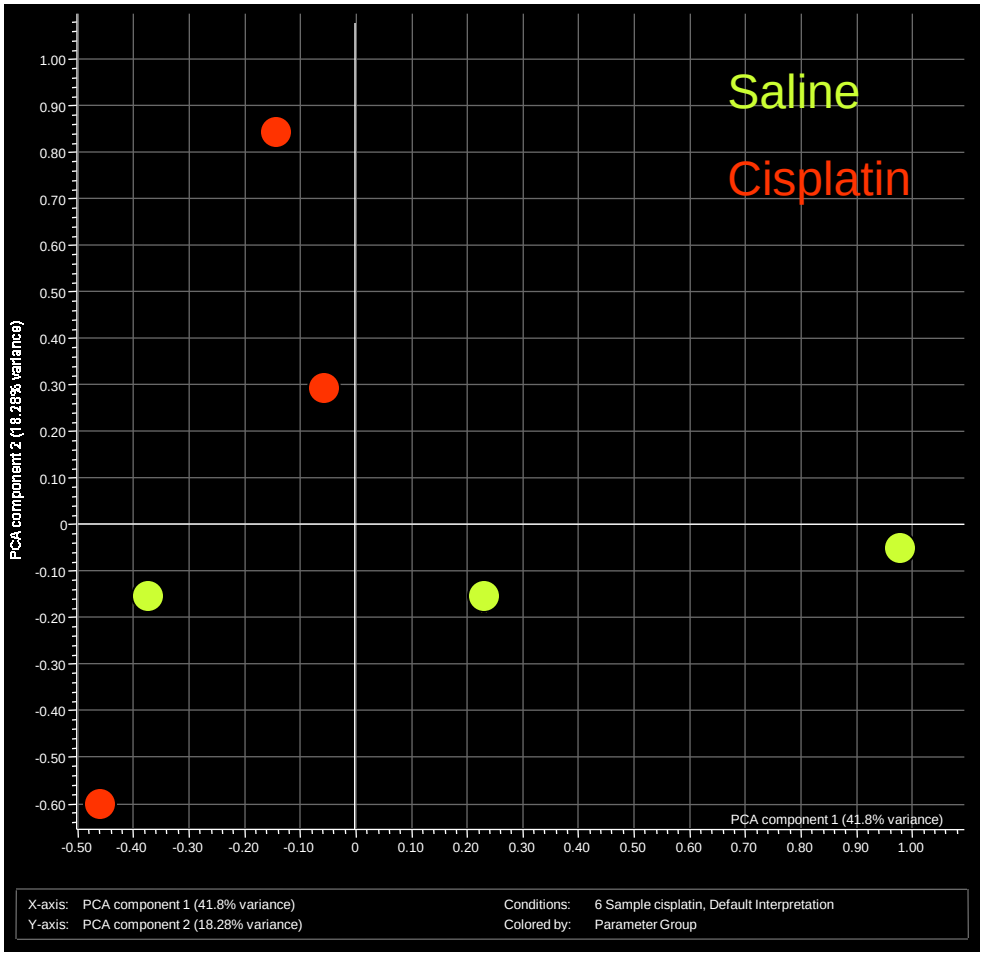






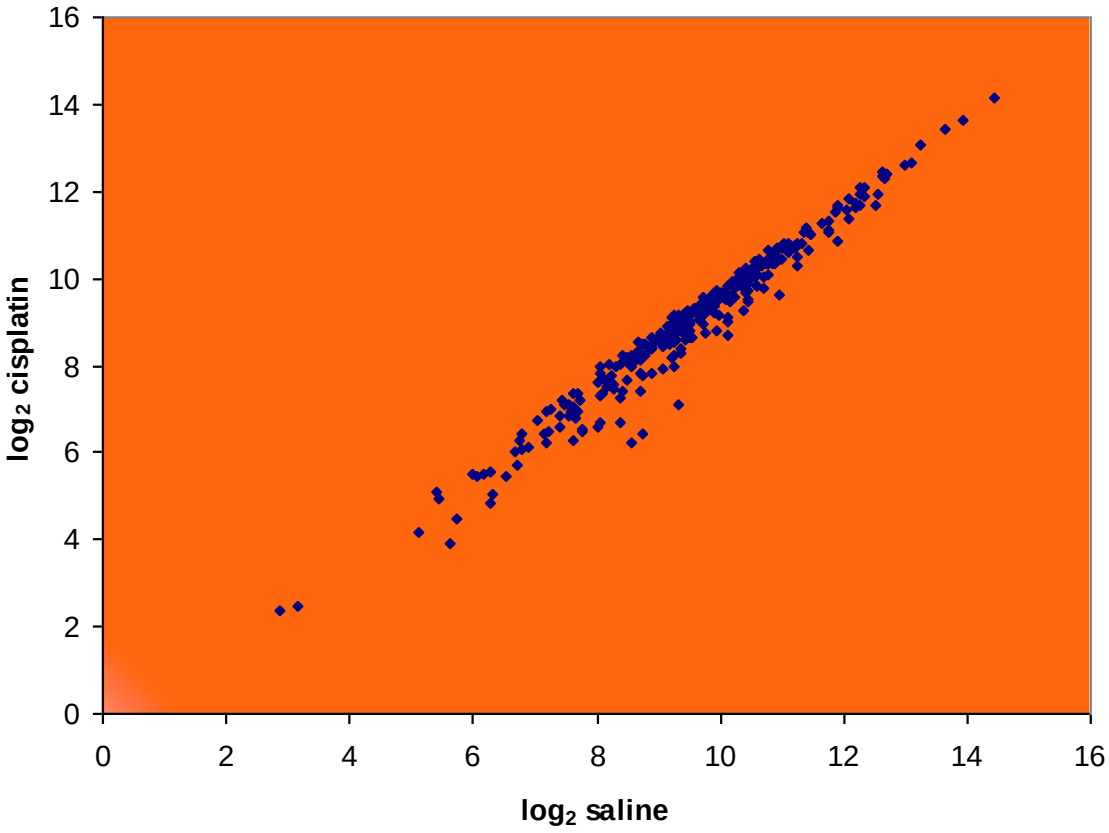
Examining gene expression patterns using principal component analysis





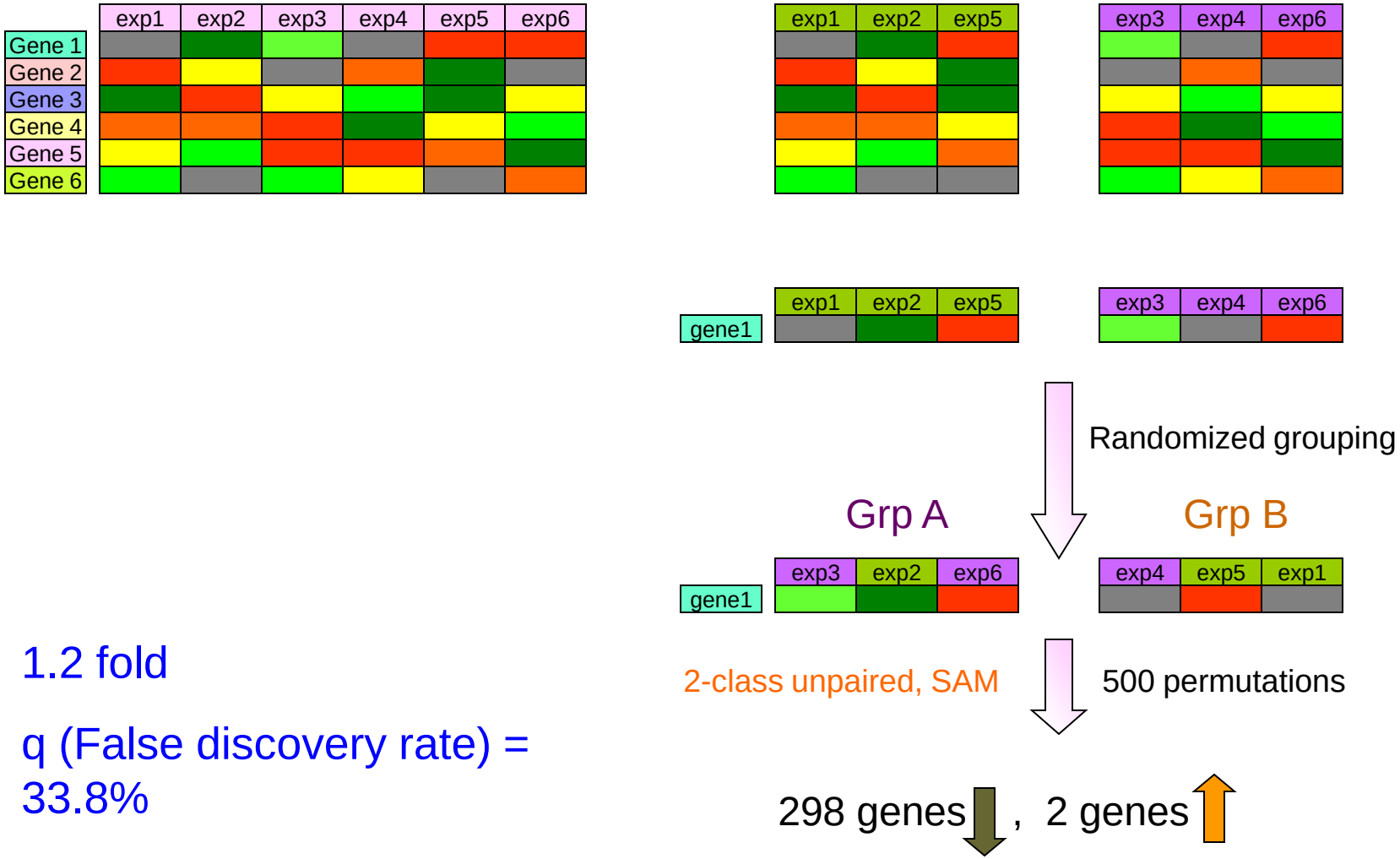
PC analysis shows lack of global effect of cisplatin on amygdalar gene expression

Scattergram of GC-RMA expression values



$r^2 = 0.96$

Which genes are significant?

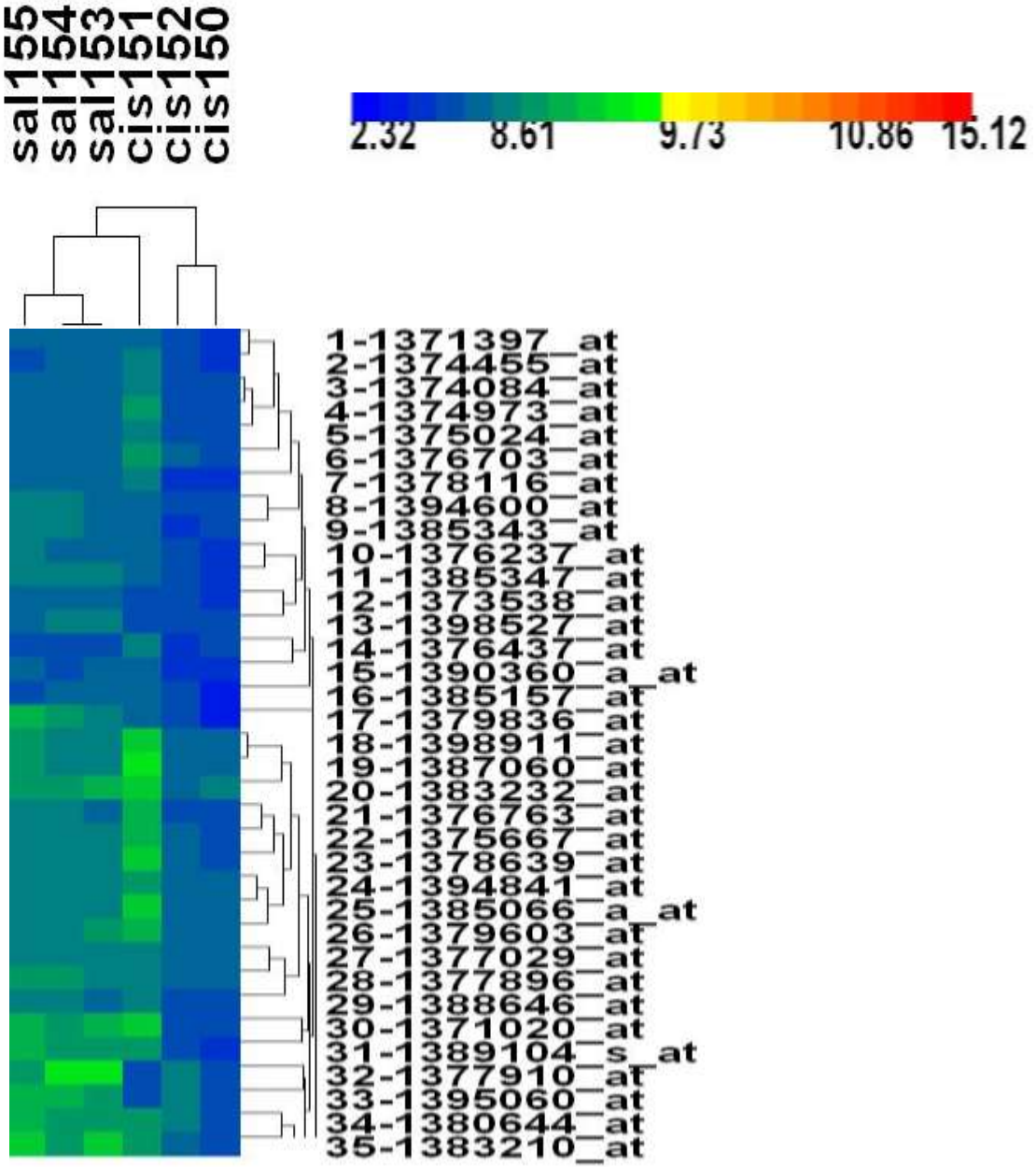


1.2 fold

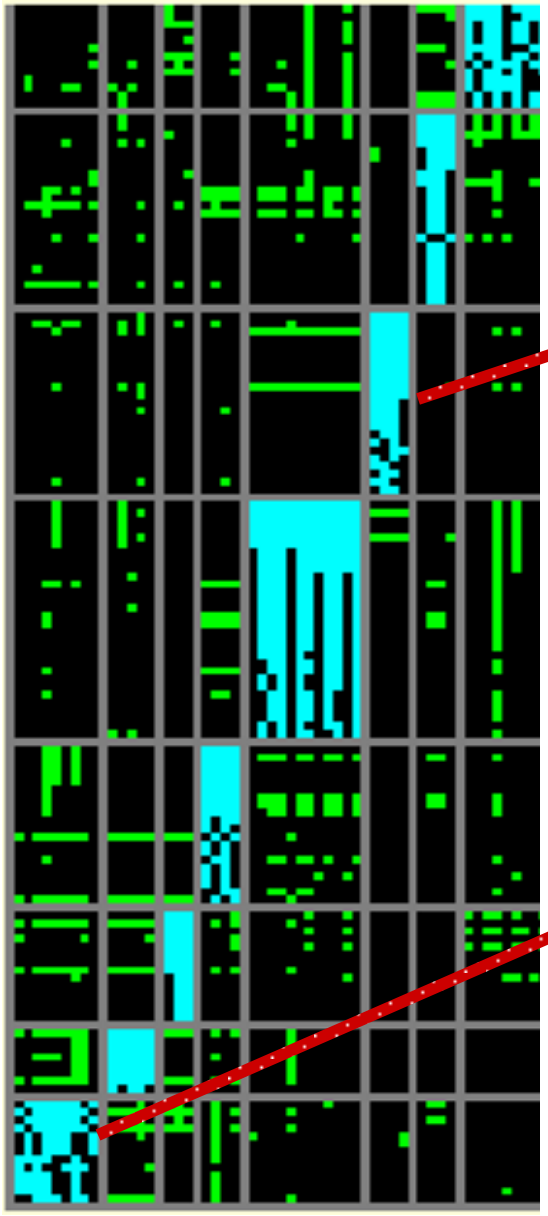
q (False discovery rate) = 33.8%

Cluster image display of 35 genes downregulated by cisplatin

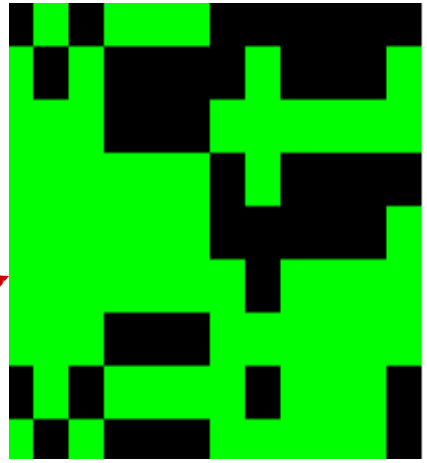
Hierarchical cluster analysis using **Clusfavor 6.0**



Gene list annotation using NIH DAVID 2.1 Beta



cytoplasmic linker 2
core promoter element binding protein
nuclear receptor subfamily 1, group I, member 3
Hypothetical protein



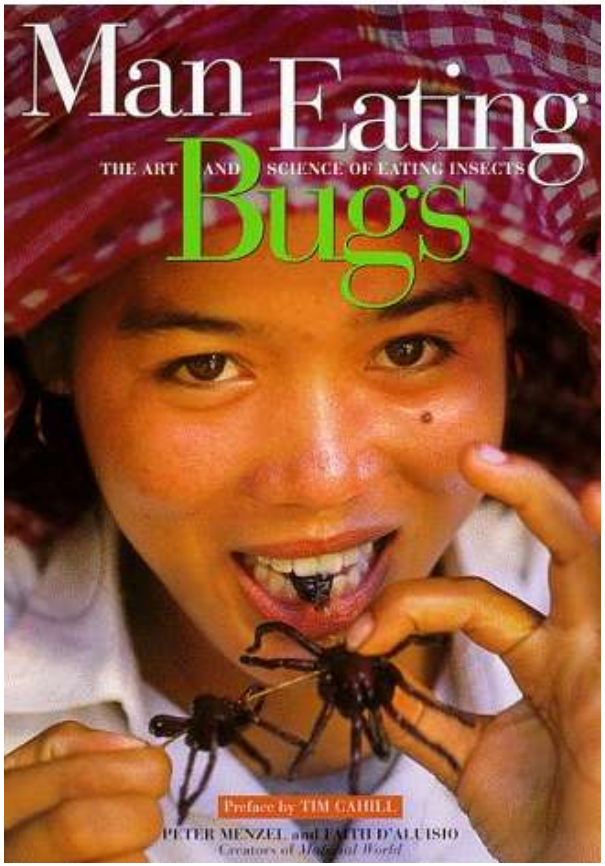
microtubule-associated protein tau
exocyst complex component 7
RAB14, member RAS oncogene family
protein kinase C and casein kinase substrate in neurons 1
tubulin, beta 5
kinesin family member 1B
huntingtin-associated protein 1
tropomodulin 2
complexin 2

Similarity term overlap = 10, κ = 0.2

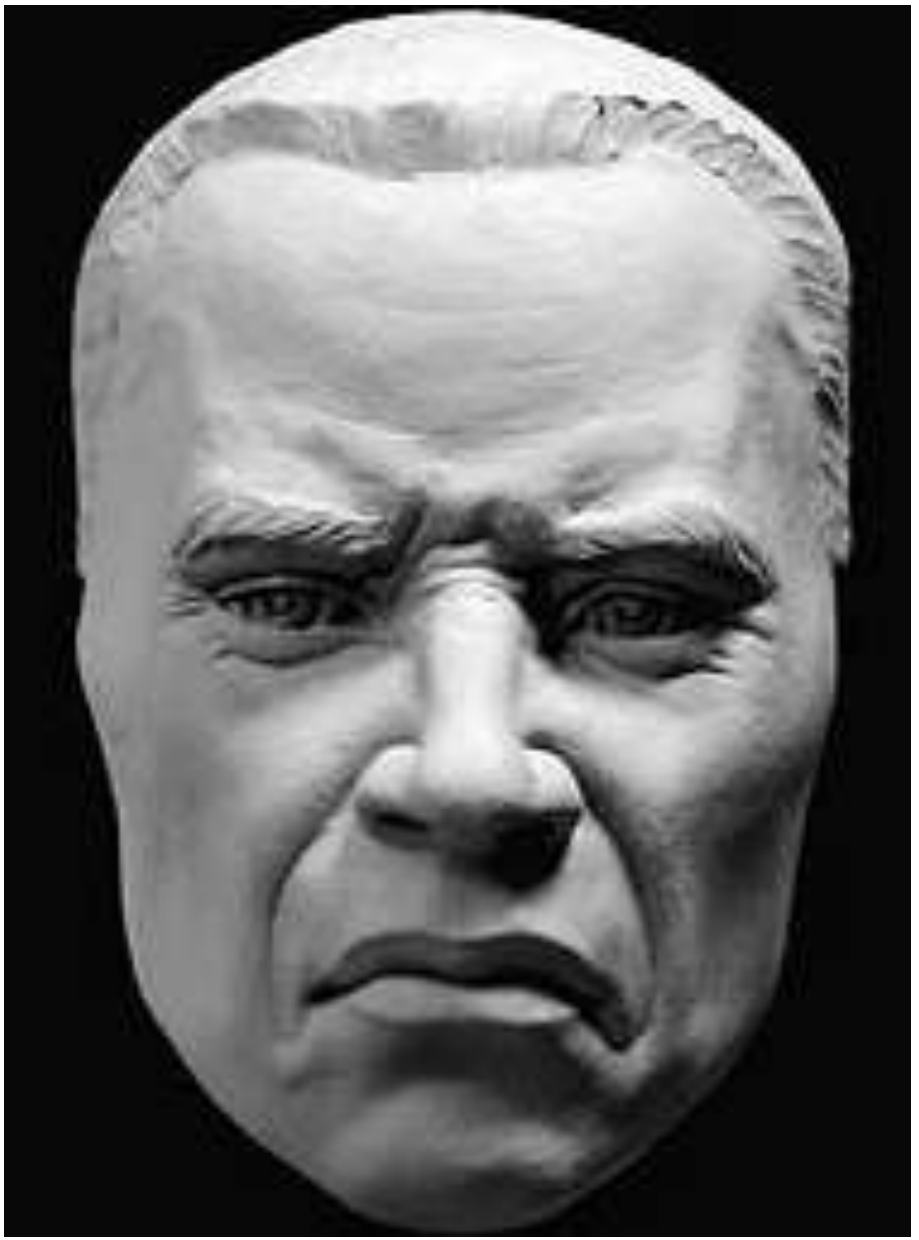
Summary

- 298 genes downregulated & 2 genes upregulated in rat amygdala, 24 hrs after cisplatin treatment
- Functional annotation of genes performed using NIH DAVID 2.1 Beta
- Ongoing supervised analysis of differentially regulated genes & biological validation

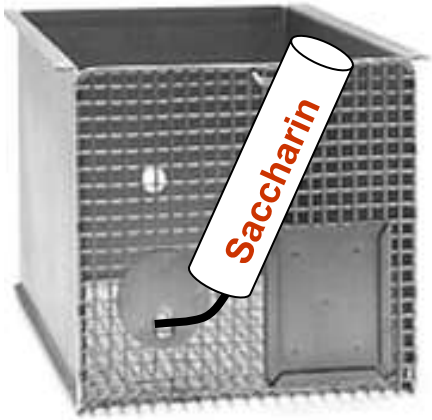
Impact of unpleasant odor & taste on nausea

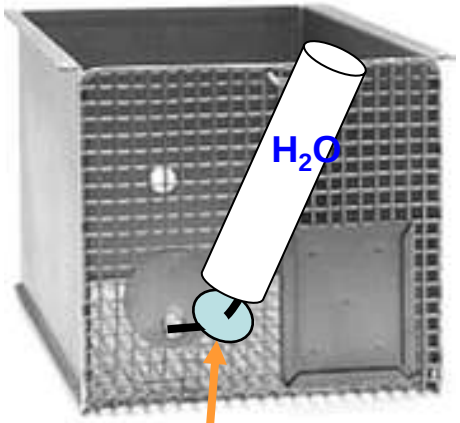


What is conditioned flavor aversion?



Ongoing project: Olfactory component in conditioned taste aversion





Saccharin (on cotton plug)

+

Acknowledgments

- Charles Horn, Ph.D
- Marc Ciucci

Thanks much for your attention!