

PROTEIN-PROTEIN INTERACTIONS

DISEASE MECHANISMS TO THERAPEUTICS

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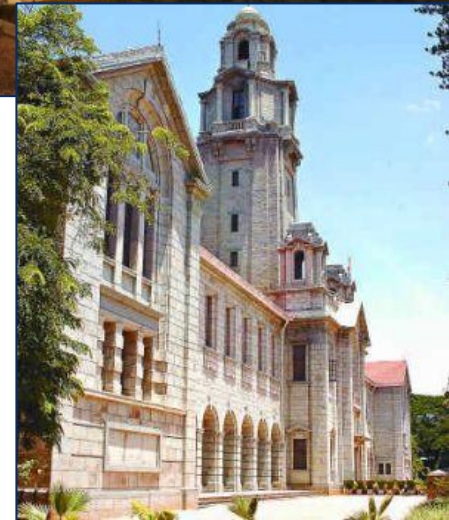
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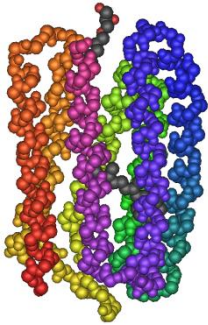


Protein-Protein Interactions

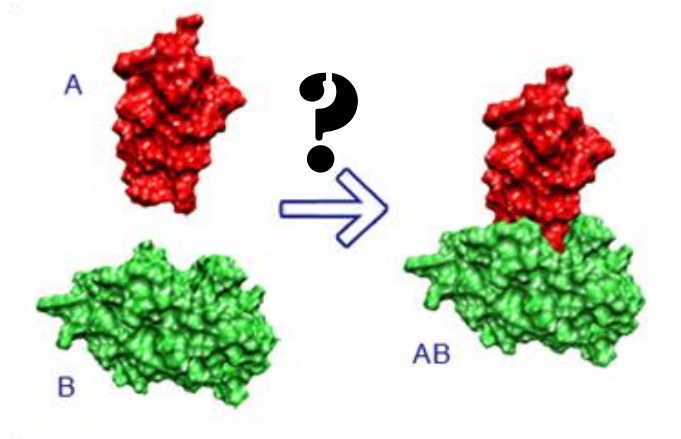
Central to all biological processes and structural scaffolds

The network is a medium for systems biology research

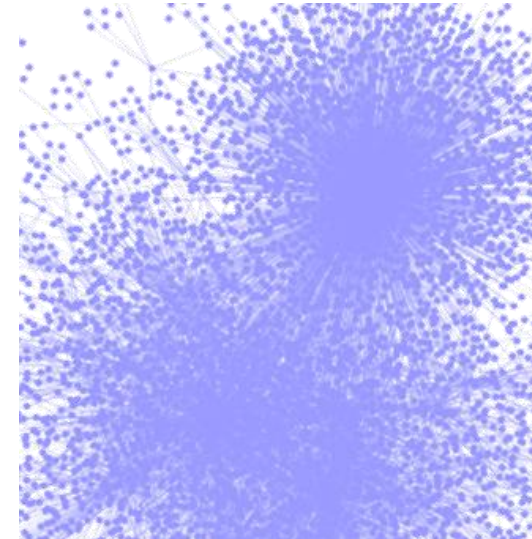
But 90% of protein-protein interactions are unknown today



~22,500
Protein-
Coding Genes



Protein-Pairs
~250 Million



Human Interactome
~1 Million PPIs Estimated
< 200k are known

Moonshots:

Discover 100k novel PPIs and Achieve 100 Translational results

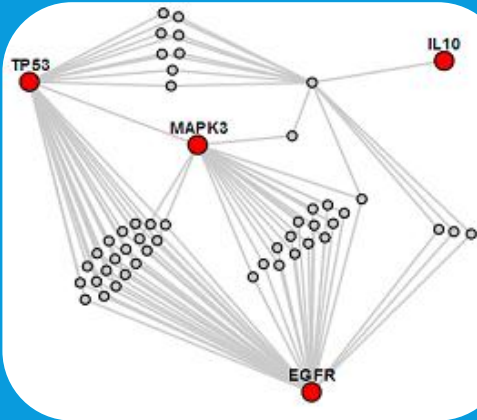
Status:

Discovered 45k novel PPIs. 18 PPIs validated by experiment, all found to be true PPIs!

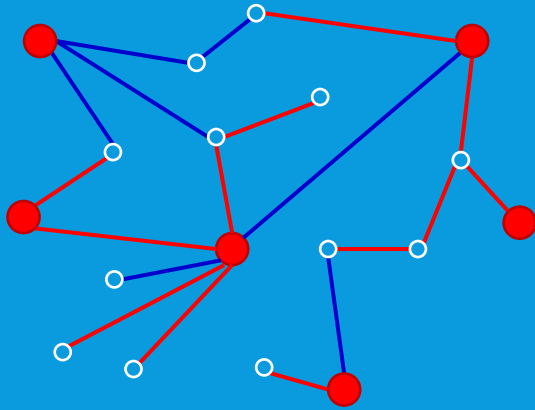
Achieved 2 high-impact translations.

Research Themes

ANALYZE



LENS



HIPPIP



BEST



Wiki-Pi

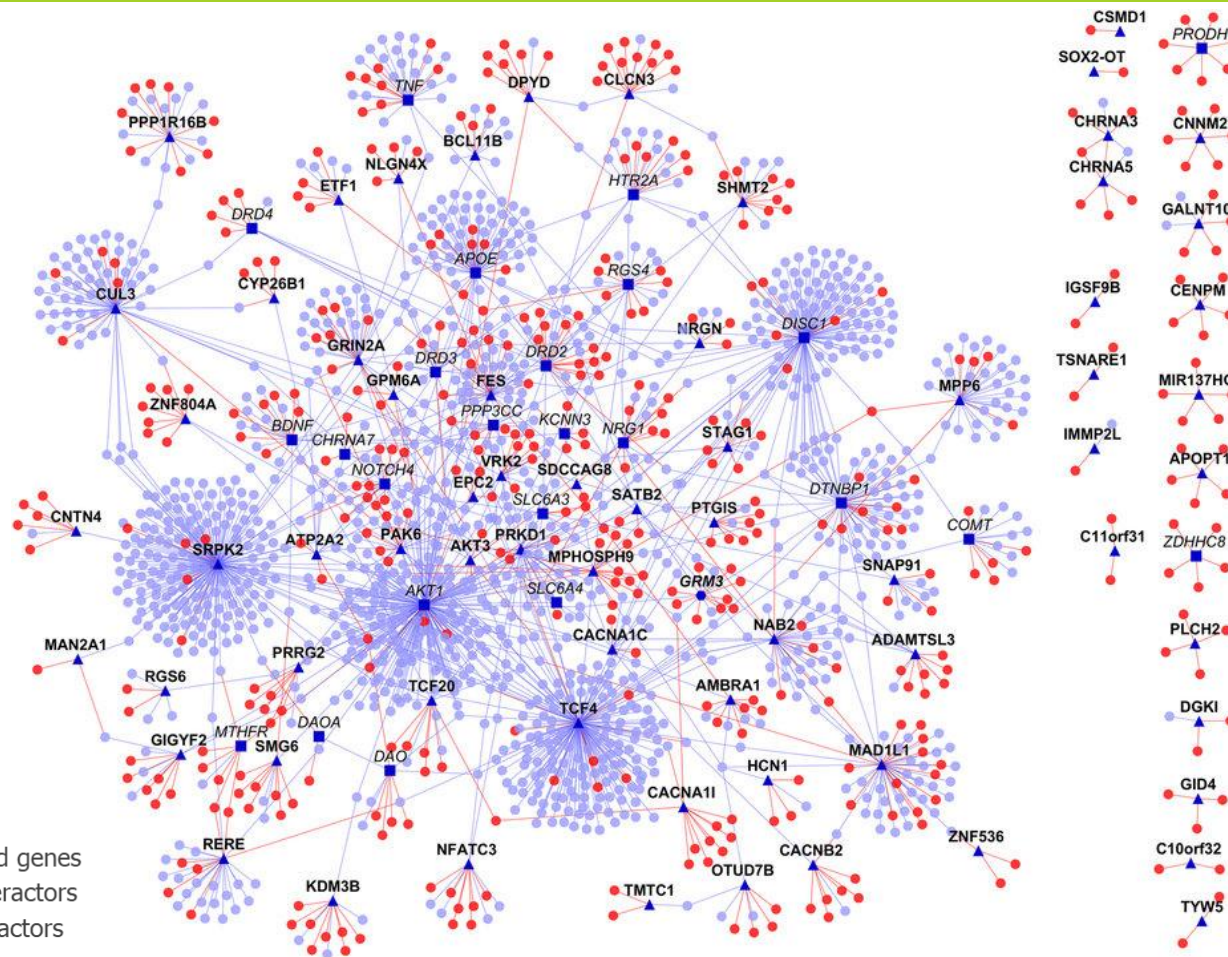
ENGAGE

ANNOTATE

PROTEIN-PROTEIN INTERACTIONS

Types of Contributions

Study of Protein-Protein Interactomes of Disease-Associated Genes

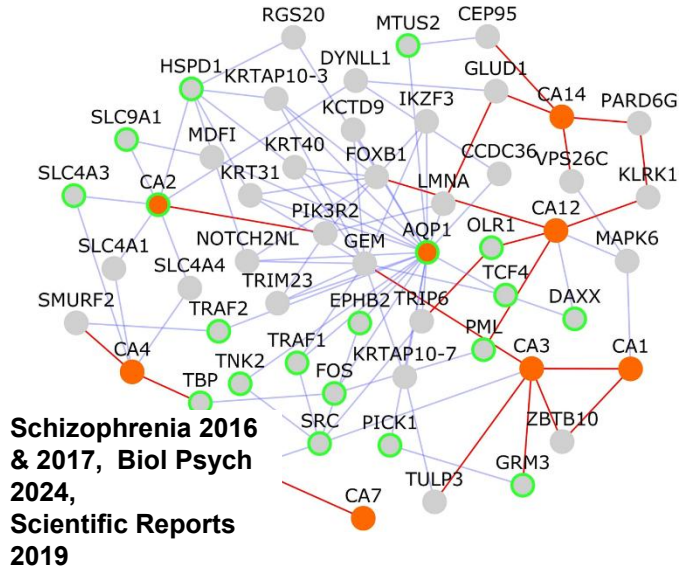


Sheds light on orphan genes (i.e., those with unknown functions)
Reveals unknown molecular connections to known pathways

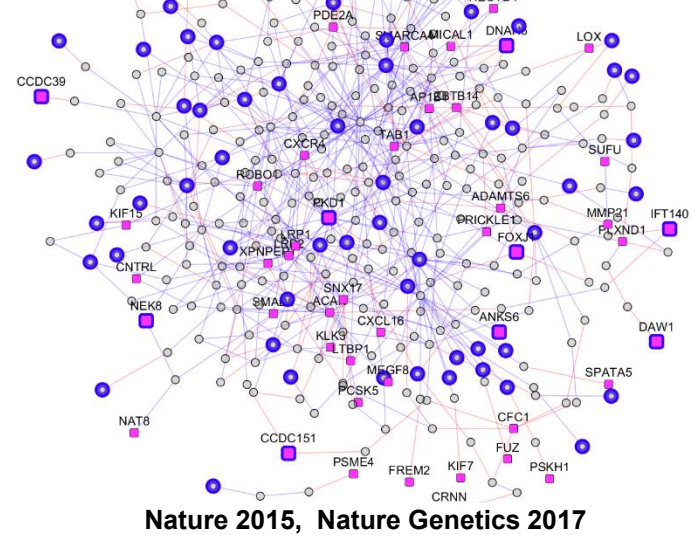
Study of drugs targeting the network for repurposability



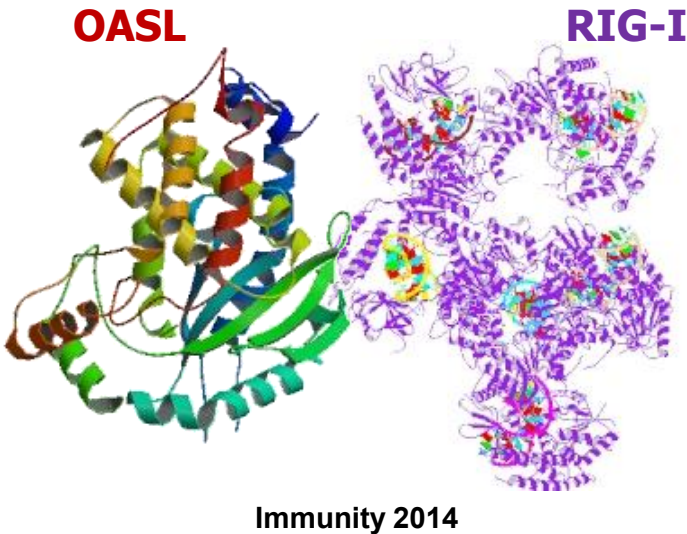
Identified 5 drugs potentially repurposable for Schizophrenia (two in Clinical Trials)



Revealed that cilia are intricately connected to Congenital Heart Diseases and Neuropsychiatric Diseases



OASL-DDX58 interaction responsible for immunity in flu virus infection



Experimentally validated protein interactions. Every predicted PPI that was studied experimentally was found to be valid.

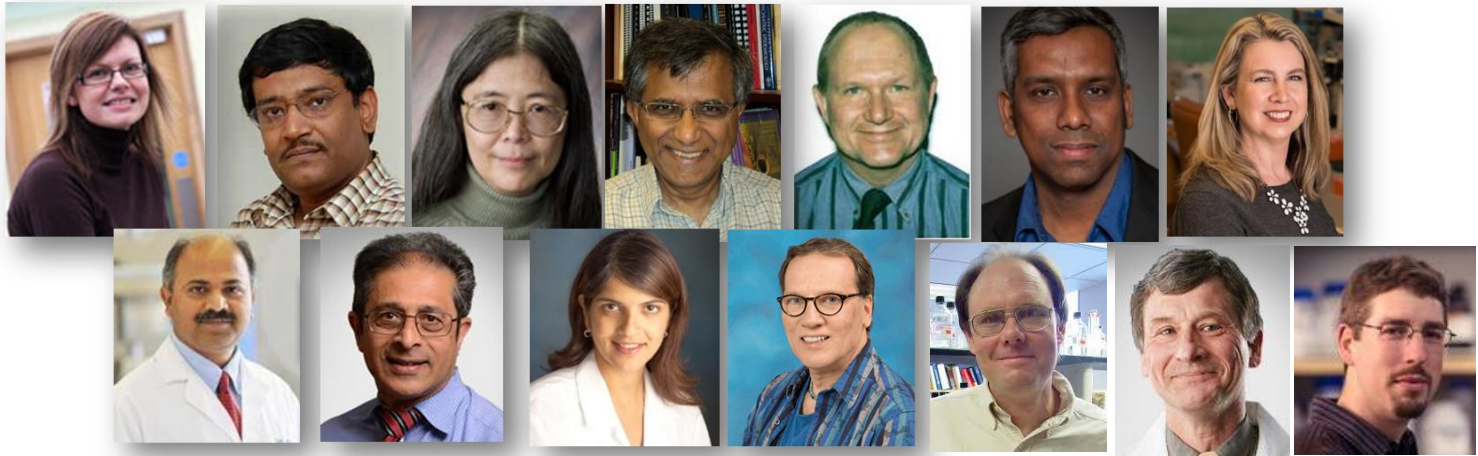
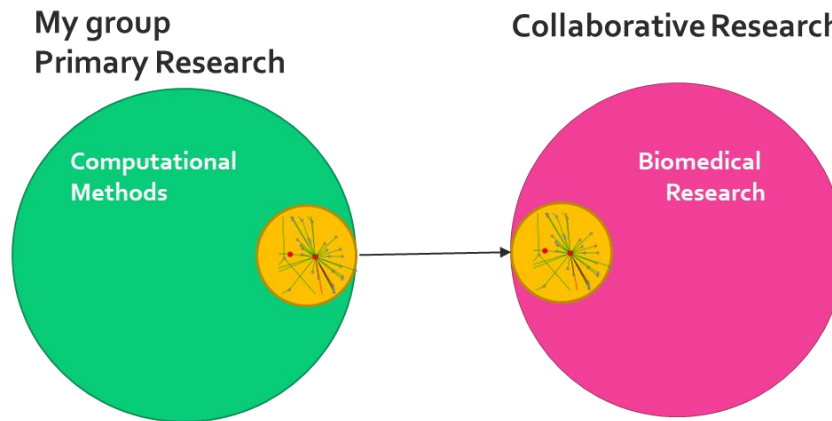
1	STT3A	RPS25	6	ALB	KDR	11	CLPS	CUTA
2	STT3A	SYCP3	7	ALB	PDGFRA	12	HMGB1	CUTA
3	STT3A	MCAM	8	STX3	LPXN	13	HMGB1	FLT1
4	DDX58	OASL	9	STX4	MAPK3	14	HMGB1	KL
5	BAP1	PARP3	10	WDR5	IGFBP3	15	IFT88	KL

<https://www.nature.com/articles/npjzschz201612>
<https://www.nature.com/articles/nature14269>
<https://www.nature.com/articles/ng.3870>
<https://www.nature.com/articles/s41537-017-0010-z>
<https://www.nature.com/articles/s41598-019-48307-w>
<https://www.sciencedirect.com/science/article/pii/S1074761314001873>
 Clinical Trials: <https://clinicaltrials.gov/ct2/show/NCT03794076>
 (2nd with IRB review)

Computationally Predicted PPIs are making Translational Impact

Types of Contributions

Translation to Bench and Bedside through Collaboration



PPIs are studied in labs, and drugs are being tested in clinic.