

Title of proposed idea: **Generate a Reference Interactome Network map**

Nominator: Marc Vidal, Ph.D.

What is the major obstacle/challenge in the field? What is needed to overcome this obstacle/challenge?

Data quality and completeness.

Needed: Empirical framework/systematization/automation/visualization/analysis.

What emerging scientific opportunity is ripe for investment by a Trans-NIH program (e.g. the NIH Common Fund)?

Follow and go beyond NHGRI ENCODE model to create a consortium with shared goals and quality standards to map protein-protein, DNA-protein, enzyme-enzyme, RNA-protein and RNA-RNA interactions (combine “can” and “do” interact technologies, *i.e.* binary and co-complex approaches).

What are the potential Trans-NIH investments that could accelerate scientific progress in this field? Programs at <http://commonfund.nih.gov/>

Bioinformatics and Computational Biology
Building Blocks, Biological Pathways and Networks
Interdisciplinary Research
Protein Capture Reagents

If a Trans-NIH program on this topic achieved its objectives, what would be the impact?

Systematic, unbiased, freely available wiring diagram for systems biology (~ = genome sequence for genetics) on which to add logical and dynamic relationships (~ = microarrays, RNAi, SNPs).

Title of proposed idea: Systematic approaches for “edgetic” perturbations of biological systems.

Nominator:

What is the major obstacle/challenge in the field? What is needed to overcome this obstacle/challenge?

Conceptual shift: 1) from single target therapeutics to “systems therapeutics”, and 2) from node perturbation to edge-specific or “edgetic perturbation”. Needed: 1) a high quality, high coverage Reference Interactome map and 2) improved perturbagens.

What emerging scientific opportunity is ripe for investment by a Trans-NIH program (e.g. the NIH Common Fund)?

Development of high-throughput screening for compound, peptides, etc can be directed to specific edges from integrated interaction/logic/dynamic network models.

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Clinical and Translational Science Awards (CTSAs)
Interdisciplinary Research
Library of Integrated Network-Based Cellular Signatures (LINCS)
Molecular Libraries and Imaging

If a Trans-NIH program on this topic achieved its objectives, what would be the impact?

Improved therapeutic strategies, more efficient drug development process, personalized medicine.