Development Of A Method For Endocrine Network Discovery Uncovers Peptide Therapeutic Targets

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SUMMARY

UCLA researchers in the Division of Cardiology at the Geffen School of Medicine have developed a bioinformatics methodology to identify and functionally annotate novel endocrine pathways.

BACKGROUND

Beginning with the discovery of insulin, endocrine tissue cross talk has been a primary focus for the detection and treatment of metabolic perturbation. Since then, many secreted peptides have been identified playing crucial roles in metabolism, immune system function, cardiovascular pathobiology, and many other aspects of physiology. Current advances in proteomics, lipidomics, and metabolomics have allowed for discovery of many additional systematic regulators of whole-body homeostasis based on the presence of secreted signal peptides from cultured single-cell or tissue-specific media. These methods are quite informative in assessing how individual tissues respond to physiologically relevant conditions and allowed for the identification of promising biomarkers for disease. However, these approaches lack the ability to gain insight to the function, mechanism of action and target tissue(s) of identified secreted proteins.

INNOVATION

Researchers at UCLA have developed a bioinformatics tool that uses multi-tissue expression arrays and publically available resources to identify and functionally annotate novel endocrine pathways. This methodology not only elucidates ranked lists of top candidate endocrine-acting peptides on a tissue-to-tissue basis, but also generates specific and testable hypotheses as to inferred function of these targets. The methodology can be easily applied to any organ set, multiple cell type profile and/or “omics” datasets in a similar fashion.

APPLICATIONS

Identify and functionally annotate secreted peptides.

ADVANTAGES

Generates specific and testable hypotheses to test for inferred function of identified secreted peptides.

STATE OF DEVELOPMENT

The method has been used for identification of lipocalin-5 as a new endocrine regulator in the adipose-to-skeletal muscle endocrine pathway, which shows promise as a therapeutic target for skeletal muscle metabolic syndrome.

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Myeloperoxidase-Deficient Mouse
- AGPAT5 as a Molecular Mediator of Insulin Resistance

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OTHER INFORMATION

KEYWORDS

Bioinformatics, secreted protein, peptide signaling, endocrine pathway, metabolism, proteomics, research tool

CATEGORIZED AS

- **Biotechnology**
  - Bioinformatics
  - Proteomics
- **Computer**
  - Software
- **Research Tools**
  - Bioinformatics

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