Interstitial Cystitis-Associated Urinary Metabolites Identified by Mass-Spectrometry Based Metabolomics Analysis

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*Confidential information included*
Urinary Metabolite Profiling Combined with Computational Analysis Suggest Interstitial Cystitis-Associated Candidate Biomarkers
Interstitial Cystitis

- A chronic syndrome of unknown etiology
- Very common bladder disease among old generation (more than one out of 77 people in USA)
- Affects quality of life, productivity and work performance—Public health burden
- Elmiron, the first FDA-approved oral drug for IC, shows unfavorable side effects
- Need for new medication for IC
- Need for objective and clinically relevant indicators
IC-Associated Mechanistic Signaling Network 1:
The Frizzled 8-Associated Antiproliferative Factor Enhances p53 Stability
Through USP2a and MDM2

p53 mediates interstitial cystitis antiproliferative factor (APF)-induced growth inhibition of human urothelial cells

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Heparin-binding epidermal growth factor–like growth factor functionally antagonizes interstitial cystitis antiproliferative factor via mitogen–activated protein kinase pathway activation

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A Synthetic Form of Frizzled 8-Associated Antiproliferative Factor Enhances p53 Stability through USP2a and MDM2

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Quantitative Proteomics Identifies a β-Catenin Network as an Element of the Signaling Response to Frizzled-8 Protein-Related Antiproliferative Factor


IC-E Associated Mechanistic Signaling Network 2:
IC-Associated Mechanistic Signaling Network 3:
Integration Analysis of Quantitative Proteomics and Transcriptomics Data Identifies Potential Targets of Frizzled-8 Protein-related Antiproliferative Factor In Vivo

Gamper method

Our method

5050 probe sets
Up:2636
Down:2414

Our method:FDR<0.01, Fold>1.40

Gamper’s method:FDR<0.01, Fold>2.00

Non-ulcer tissue
Healthy

Inflammation pathways
1. TCR signaling pathway;
2. BCR signaling pathway;
3. FcεRI signaling pathway;
4. TLR signaling pathway;
5. Antigen processing and presentation;
6. Leukocyte transendothelial migration.
'OMICS’ Approaches to Understand Intersitital Cystitis

More 'OMICS’ Profiles using the Cutting-Edge Technology are needed

Integration analysis of quantitative proteomics and transcriptomics data identifies potential targets of frizzled-8 protein-related antiproliferative factor in vivo

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‘Omics’ Approaches to Understanding Interstitial Cystitis/Painful Bladder Syndrome/Bladder Pain Syndrome

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Differentiation of IC patients and healthy control groups using multivariate analysis
A volcano plot showing differentially expressed metabolites in IC patients.
Network modeling derived from IC-associated metabolites
Differential network in IC is identified with multilevel local graphical model.
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