Methods for Diagnosing and Treating Endoplasmic Reticulum (ER) Stress Diseases

Keywords: Diabetes, ER Stress, IRE1, XBP-1, unfolded protein response (UPR), WFS1

US and National Phase patents pending

Applications

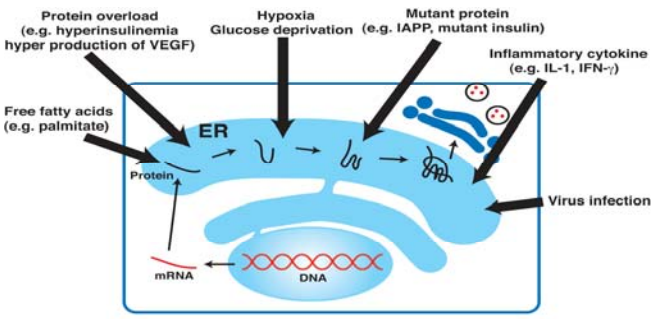
ER Stress Diseases, including but not limited to Diabetes,, Parkinson's disease, Alzheimer's Disease.

Background

Proteins must undergo processing in the Endoplasmic Reticulum to assume the three-dimensional structure required for their normal function. This occurs via a tightly-regulated protein folding process involving post-translational modifications. This pathway can be perturbed by a number of factors, resulting in faulty processing and defective secretion of improperly folded proteins. This results in what is known as ER Stress, which then triggers the Unfolded Protein Response (UPR). If the UPR is able to handle the degree of ER Stress, the cell can function normally. However, when the level of ER Stress is too high, this can result in abnormal secretion of affected cellular proteins, cell death, or abnormal cell function.

Technology

UMass Medical School investigator Dr. Fumihiko Urano and colleagues have elucidated methods for diagnosing and targets for treating ER Stress disorders, with a current focus on diabetes. These methods are based on the quantification of the levels of ER Stress in cells by monitoring the levels and activity of specific biomarkers associated with the ER Stress and UPR pathways. These biomarkers include IRE1, HRD1,WFS1, and XBP-1. Activated IRE1 splices XBP-1 mRNA, resulting in upregulation of XBP-1 protein expression, and upregulation of the UPR genes and ER Stress-associated protein degradation.



Salient Features and Competitive Advantages

- ***Novel Diagnostic Tool:*** This method can be used to diagnose or confirm diagnosis of a number of ER Stress diseases.
- ***Novel Targets for Drug Discovery:*** The quantifiable biomarkers here can be used in the screening for novel therapeutics as potentially druggable targets.
- ***Novel Targets for Drug Development:*** These methods can be used to validate therapeutics in the research and development stages for ER Stress-related diseases.
- ***Relieving ER stress*** could provide a new target for a broad spectrum drug development.
- ***Broad applicability***: can be utilized for diagnosing, treatment and prevention of disease characterized by ER stress.
- ***Market potential***: The Global Diabetes drugs treatment market was valued of $15 billion in 2005. The Global Diabetes Market Will Exceed $21 Billion by 2011.

Business Opportunity

UMass OTM is seeking statements of interest from parties interested in licensing and/or sponsoring collaborative research to further develop, evaluate, or commercialize this technology.

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