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Renal Proteins Biomarkers: It's Physiological Significance

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Abstract: ***Biomarkers play important role in modern medicine. These Biomarkers are released into the various Body fluids, tissue's and other secretions of body, which help to Diagnose, monitor the therapeutic improvement and also assist in the prognosis of Disease conditions. Over these years through the efforts of various researchers, these tissue specific and disease specific Biomarkers have been used extensively in modern medicine. These Biomarkers have proved to be organ specific and disease specific with reasonable sensitivity which can be measured in vitro system. These organ specific Biomarkers are not detectable in healthy individuals significantly, hence their usage in Medical field is increasing over these years. It's interesting to understand equally their (Biomarkers) physiological significance and role in disease progression. We focus here on Renal Protein Biomarker's as they suggest some important underlying physiological changes during the course of the disease.***

Keywords: Biomarkars, Kidney Injury, NGAL, CYSC, IL-18, KIM 1, L – FABP

1. Introduction

Biomarker's or Biological marker's are known to be some indicator for some Biological or Physiological condition or sate of individual in health and disease. These are mostly in detectable form which can be measured either from tissue, blood, urine or some biological secretions (1) These Biomarker's indicate phathologic process or therapeutic response during treatment and also indicate normal Biological or physiological process. (2) These Biomarkers are further divided into four classes which can be either based on Histology or based on radiographic or based on molecular or physiological change (3) The study of these Biomarkers are known to have Diagnostic, Therapeutic, Prognostic and predictive value in the modern medicine. In this article we are focusing on Protein Renal Biomarkers and their physiological significance.

Some of the promising Biomarkers for early kidney injury are **NGAL, KIM-1, IL-18, L-FABP, CystatinC** which are frequently used in the management of kidney injury. (4)

a) **Neutrophilg fefatinase-associated lipocalin (NGAL):** This is the Biomarkers Protein in nature coded by the Lipocalin 2 (Icn2) gene which is expressed during the kidney injury. (5) NGAL is known to have Bacteriostatic role which is well characterized in the literature. (6) Some bacteria produces Siderophores in order to chelate and uptake of Iron. In response to this NGAL is released at the site of Infection and Inflamation which binds with bacterial siderophores-Iron complexes thus preventing or limiting the Iron to bacteria and provides antibacterial activity.
b) **Interleukin -18 (IL – 18)** is involved in the innate immune system and its role is well established in the defense mechanism against the infection (7,8,9)
c) **KIM-1** (Kidney Injury Molecule-1) is involved in the tissue repair and development and also plays important role in the elimination of Pathogen infected cells in host. (10),
d) **Liver fatty and binding protein (L-FABP)** is a 14 KDa protein normally expressed in the kidney. It is known to play a central role to lipid –mediated processes and related metabolic and immune response pathways.(11)
e) **Cystatin C(cysC)** is known to have cysteine protease inhibitor action which is 13 KDa protein encoded by CST 3 gene. It plays important role in Innate Immune system which blocks the Pathogens. As these Pathigens have the ability to secrete protease to subvert the host immune defense to gain entry in cells.(12)

2. Discussion

It is clear from the above studies that these Protein Renal Biomarkers are released during the disease processes which suggests of presence of some Pathogen involvement in the processes. These Biomarkers lack sensitivity and specificity renderring limitation to its usage(13). The nature of action of these Biomarkers clearly shows that the underlying Pathology during kidney injury is caused due to the invasion of some pathogen. The molecular studies of these Biomarkers clearly indicate that these Biomarkers have major role in innate Immune System and plays role in defense mechanism targetting Invadig Pathogen. **Fig .1**

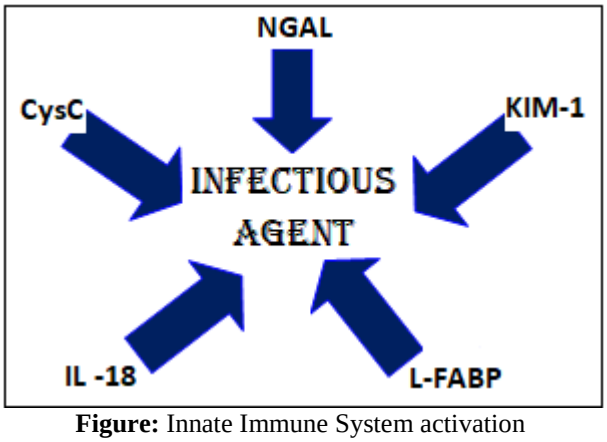

Figure: Innate Immune System activation

My search in this filed suggests the presence of some Pathogen which remains "HIDDEN" throughout the course of the disease (13, 14, 15, 16). The physiology of every individual tries to restore the normally in case of invasion by Pathogen by secreting various target specific Biomarkers. The research in this theme would have greater impact and new strategies could be designed for the total CURE OF KIDNEY INJURY rather than just CONTROLLING it. Since there is no Total CURE at present for this condition patients are usually trapped into viscious cycle of Recovery and Relapse, which results into End Stage Renal disease **ESRD**, My research support the presence of PATHOGEN in kidney Injury which need to be explored further.

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