Washington University in St. Louis
Office of Technology Management

ANTI-MIOX ANTIBODIES FOR SENSITIVE, SPECIFIC EARLY DETECTION OF ACUTE KIDNEY INJURY

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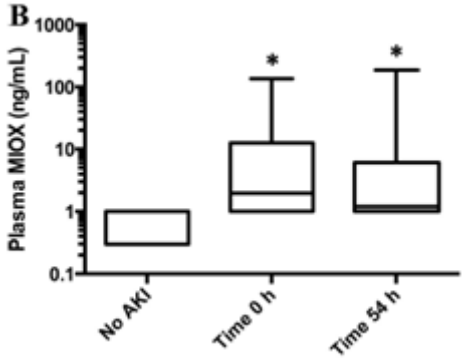
Technology Description

A team of researchers at Washington University in St. Louis have developed patented antibodies designed to identify MIOX (*myo*-inositol oxygenase), a renal-specific biomarker that can be detected immediately following acute kidney injury (AKI). AKI can be caused by surgery, sepsis or drug toxicity. It is traditionally diagnosed by measuring serum creatinine, a non-specific marker that can take hours to accumulate in the blood after a kidney injury, thereby delaying potential treatment. Anti-MIOX antibodies offer an alternative to creatinine, detecting elevated MIOX in patients with AKI approximately two days prior to creatinine increase. These antibodies could be used for real-time, sensitive and specific immunodiagnostics to detect AKI early enough to offer a window for therapeutic intervention before significant kidney function is lost. In addition, the antibodies could be used for monitoring renal toxicity of pharmaceuticals, evaluating graft function after kidney transplants or performing basic research studies of kidney function and development.



*MIOX increases in human patients with AKI. Creatinine was stable at time 0 h, and increased at time 54 h (*p<0.002).*

Stage of Research

- **Animal models** – demonstrated that MIOX is elevated in plasma following transplantation and correlates with the presence of histological tissue damage
- **Human validation** – demonstrated that MIOX: is elevated in plasma collected from critically ill patients with acute kidney injury; was highest in patients with more severe injury (those who were olguric or required dialysis); and preceded serum creatinine elevation by about 2 days
- **Prospective studies** – tested the sensitivity and specificity of MIOX for detecting AKI in patients undergoing cardiopulmonary bypass

Applications

- **Diagnostics –** antibodies can be used in a quantitative immunoassay to detect acute kidney injury (AKI) caused by surgery, sepsis or drug toxicity, with end user applications such as:
  - risk stratification to determine candidates for further evaluation or treatment
  - detecting delayed graft function in kidney transplant recipients
  - monitoring renal toxicity of pharmaceuticals or contrast agents
- **Research** – basic studies of kidney function and development

Key Advantages

- **Sensitive and specific:**
  - MIOX is a renal specific, proximal tubule protein
  - correlates with severity of injury
  - easy measurement with no interference from other substances in serum
- **Early detection:**
  - the MIOX biomarker can be detected immediately following kidney injury, about 2 days prior to traditional serum creatinine elevation
  - opens therapeutic window for treating the injury prior to significant loss of kidney function

Publications

- Gaut, J. P., Crimmins, D. L., Ohlendorf, M. F., Lockwood, C. M., Griest, T. A., Brada, N. A., ... & Ladenson, J. H. (2014). Development of an immunoassay for the kidney-specific protein myo-inositol oxygenase, a potential biomarker of acute kidney injury. *Clinical chemistry*, 60(5), 747-757.

Patents

- Miox antibody and assay (U.S. Patent No. 10,060,925)