

**Applications:**

- Detection of acute cardiac ischemia in near real-time
- Allows for earlier treatment to limit or prevent myocardial infarction
- Several different detection modalities have been developed
- Application in the first responder setting is envisioned

**Advantages:**

- Rapid, sensitive and low cost luminescence assay available
- Point-of-care - using standard laboratory equipment

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**“Rapid Detection of Acute Cardiac Ischemia”**

**VCU # 07-48**

**Market Need:**

Each year in the U.S., approximately 7-8 million patients with non-traumatic chest pain visit hospital emergency rooms for medical evaluation. It is estimated that approximately 2-5% of these patients are experiencing acute cardiac ischemia, but due to the shortcomings of current test methods, they are incorrectly diagnosed and discharged without appropriate treatment provided, thus leading to poor patient outcome and potential medical malpractice litigation. For the last decade, testing for biomarker cardiac troponin in patients with chest pain has become part of the standard of care provided by emergency departments. However, this biomarker is not detectable for at least four to six hours after symptom onset, by which time irreversible myocardial injury has occurred. Recently, many research groups have focused on finding biological markers that are early indicators of cardiac ischemia that can lead to better therapeutic outcomes for patients, including prevention of myocardial injury.

**Technology Summary:**

VCU researchers have developed a rapid, sensitive and low cost luminescence assay for detecting acute cardiac ischemia. Hypoxanthine and inosine were demonstrated to be significantly elevated in ischemic animal heart experiments and in plasma samples from patients with cardiac disease. Hypoxanthine is detected in a biological sample by addition of xanthine oxidase, which generates hydrogen peroxide and superoxide anion radicals. Either of these resulting products may be quantitatively detected by several different methods. Inosine is first treated in the biological sample using purine nucleoside phosphorylase, to convert the inosine into hypoxanthine. The enzymatic reactions and subsequent detection of the resulting products is accomplished in just a few minutes, allowing clinicians to make timely treatment decisions.

**Inventors:** Farthing, Xi, Karnes, Sica, Gehr, Gehr and Unverdorben

**Technology Status:** PCT patent application filed. Demonstrated in a mouse myocardial ischemia model and in patients experiencing non-traumatic chest pain and cardiac patients with confirmed acute myocardial infarction. Preparing for a clinical study involving patients undergoing acute cardiac ischemic conditions.

**Plasma Inosine and Hypoxanthine Concentrations of Chest Pain Patients and Healthy Normal Individuals**

