



## New Disulfide-Bond Reducing Agent

**INVENTORS • Ronald Raines, John Lukesh**

**WARF: P140284US01**

[View U.S. Patent No. 9,371,521 in PDF format.](#)

**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a reducing agent for disulfide bonds that outperforms DTT or any other known dithiol.**

### OVERVIEW

Disulfide bonds between cysteine residues are the most common crosslinking agents in proteins. Reducing these bonds is an ordinary procedure in biochemistry and biotechnology. The most commonly used reducing agent is dithiothreitol (DTT or “Cleland’s Reagent”).

Despite its high cost, DTT is potent and remains the standard reagent for reducing disulfide bonds in biomolecules. At physiological pH levels, however, DTT becomes sluggish and unreactive. There remains a need for new and cheaper reducing agents that can be utilized in biological systems.

### THE INVENTION

UW–Madison researchers have developed a fast-working pyrazine dithiol that can be prepared from inexpensive starting material. The new reagent, 2,3-bis(mercaptomethyl) pyrazine (BMMP), is synthesized in three simple steps from the commonplace aromatic chemical 2,3-dimethylpyrazine.

### APPLICATIONS

- Research and synthetic reagents
- Reducing or preventing the formation of disulfide bonds
- Regulating the function of proteins with sulfhydryl group-associated activity
- Enhancing the activity/preventing inactivation of biomolecules *in vivo* or *in vitro*

### KEY BENEFITS

- Shows enhanced reactivity under biological conditions

### THE WARF ADVANTAGE

Since its founding in 1925 as the patenting and licensing organization for the University of Wisconsin-Madison, WARF has been working with business and industry to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.



- Lower thiol pK<sub>a</sub> than DTT
- Works up to 10 times faster
- Less odor
- Simpler molecule
- Synthesized readily from cheaper starting materials

## STAGE OF DEVELOPMENT

BMMP has been shown to reduce protein disulfide bonds *in vitro*.

## ADDITIONAL INFORMATION

### Related Technologies

[WARF reference number P110330US02](#) describes another disulfide-bond reducing agent, dithiobutylamine (DTBA), synthesized from aspartic acid.

### Tech Fields

Materials & Chemicals - Biochemicals

Research Tools - Protein interactions & function

## CONTACT INFORMATION

For current licensing status, please contact Jennifer Gottwald at [jennifer@warf.org](mailto:jennifer@warf.org) or 608-960-9854.