

# Research reveals how the buxu tongyu granule alleviates myocardial ischemia

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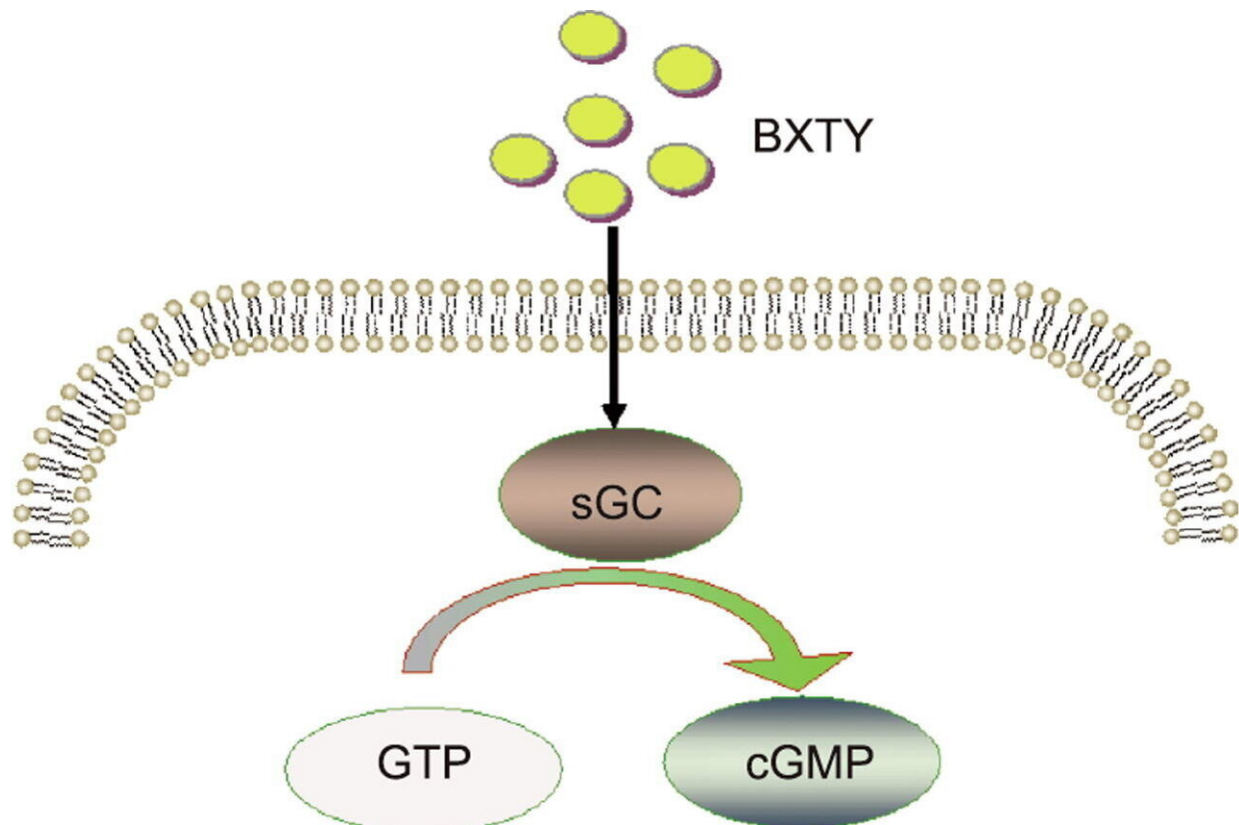


Diagram depicting the proposed molecular mechanisms for the BXTY-induced vasomotion of the superior mesenteric artery. Credit: Shuang Yang et al.

Myocardial ischemia, a condition characterized by inadequate blood supply to the heart muscle, affects millions of people worldwide. While

the focus of treatment has traditionally been on opening blocked arteries, recent research has shed light on the role of abnormalities in coronary microvessels and vascular smooth muscle cells (VSMCs) in myocardial ischemia.

A new study investigating the pharmacological effects of buxu tongyu (BXTY) granule, a traditional Chinese medicine, has shown promising results in alleviating myocardial [ischemia](#) by activating the soluble guanylate cyclase (sGC)–3′,5′-cyclic guanosine monophosphate (cGMP)–protein kinase G (PKG) signaling pathway in VSMCs.

Myocardial ischemia occurs when the [heart muscle](#) does not receive enough oxygen due to inadequate blood supply from the coronary arteries. This condition is primarily caused by coronary artery spasm, atherosclerosis, cardiomyocyte hypertrophy, and cardiomyopathy. BXTY has long been used in traditional Chinese medicine to treat coronary heart disease and atherosclerosis. However, the underlying mechanism of its therapeutic effects remained unclear.

In this study, researchers administered BXTY to mice via gavage for ten consecutive days before inducing acute myocardial ischemia through the injection of pituitrin. The results showed that BXTY effectively alleviated the symptoms of myocardial ischemia induced by pituitrin, including electrocardiogram abnormalities and changes in plasma enzymes.

Furthermore, BXTY demonstrated its ability to dilate pre-constricted blood vessels and inhibit vasoconstriction in a dose-dependent manner. These effects were not dependent on the presence of endothelial cells. The researchers discovered that BXTY achieved these vasodilatory effects by activating the sGC–cGMP–PKG pathway in VSMCs.

To further elucidate the mechanism of action, the researchers

investigated the protein expression of sGC- $\beta$ 1 and the intracellular second messenger cGMP level in mouse aortic VSMCs (MOVAs). They found that NS 2028 or ODQ reversed these effects of BXTY. The expression level of the cGMP downstream effector protein PKG-1 increased after treating MOVAs with BXTY. NS 2028, ODQ, or KT 5823 also reversed this effect of BXTY.

These findings demonstrate that BXTY can effectively improve the symptoms of acute myocardial ischemia in mice. By activating the sGC-cGMP-PKG pathway in VSMCs, BXTY induces vasodilation and inhibits abnormal vasomotion. The preventive administration of BXTY was found to be as effective as the therapeutic administration of nitroglycerin, a classic clinical anti-myocardial ischemia drug.

This study not only highlights the potential of BXTY as a treatment for myocardial ischemia but also bridges the gap between [traditional medicine](#) and modern medical systems. With its traditional roots and promising pharmacological effects, BXTY may offer new hope for patients suffering from [myocardial ischemia](#).

By using modern pharmacological techniques to investigate the pharmacological effects and action mechanisms of traditional drugs, this research paves the way for further drug development and promotes communication between different branches of medicine.

The research appears in *Engineering*

**More information:** Buxu Tongyu Granule Alleviates Myocardial Ischemia by Activating Vascular Smooth Muscle Cell Soluble Guanylate Cyclase to Inhibit, *Engineering* (2023). [DOI: 10.1016/j.eng.2023.06.009](https://doi.org/10.1016/j.eng.2023.06.009)

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