Tanshinone is one of the active principles of *S. miltiorrhiza*. The pure substance has limited clinical use because it is poorly soluble in water. A water-soluble derivative, tanshinone II sodium sulfonate, was prepared [7] and tested biologically. In dogs, injection of tanshinone II sodium sulfonate at a dose of 1 mg/kg into the distal end of the descending coronary artery beyond the occlusion significantly reduced the size of acute myocardial infarct 24 h after administration. The vascular deficit areas markedly diminished or disappeared. The results suggest that the beneficial effects of tanshinone II sodium sulfonate on ischemic hearts may be related to an acceleration of the opening of coronary collaterals [51, 52].

A clinical investigation of tanshinone sodium sulfonate in 180 patients with coronary heart disease having abnormal electrocardiograms showed a significant effect as evidenced by electrocardiograms as well as improvement of angina pectoris and chest oppression [7].

In vitro, tanshinone II sodium sulfonate showed a membrane-stabilizing effect on red blood cells as evidenced by increased resistance against hemolysis caused by hypotonic solution, heat, low pH, or saponin [53].

No toxic effects were observed in mice and rats after oral or s.c. administration of the extract of *S. miltiorrhiza*. Antipyretic activity of the extract in rabbits and antiinflammatory activity in rats with infective arthritis and in mice with croton oil induced inflammation of the ear were also reported [54]. Furthermore, tanshinone-related pigments showed bacteriostatic activity against *Staphylococcus aureus* [54] and *Mycobacterium* sp. [55]. However, these pigments were bound by plasma protein to varying degrees and protein binding significantly decreased their bacteriostatic activity [55].

Results of pharmacokinetic studies with [^{3}H]tanshinone II sodium sulfonate in rats were reported. Radioactivity was highest in liver, followed by spleen, kidney, and lung after i.v. administration. Peak levels of radioactivity in organs were reached 2 h after injection. The half-lives of the substance for the fast and slow phase were 27 and 199 min, respectively. Within 72 h, 75% of the administered activity was excreted in the feces and 18% in the urine. Three undefined metabolites were found by thin-layer chromatography and autoradiography from bile, urine, and feces [56]. Biotransformation of cryptotanshinone into tanshinone II by hydrogenation in the liver was observed after administration of cryptotanshinone into the duodenum of rats [57].

Danshensu, 3,4-dihydroxyphenyllactic acid, is another active compound isolated from the root of *S. miltiorrhiza*. It was found to dilate isolated swine coronary artery and to antagonize the constricting response elicited by morphine and propranolol. These interactions have been considered of practical importance in cases when propranolol or morphine might be administered concomitantly with danshensu for treatment of severe angina attacks. On the other hand, danshensu showed no antagonistic effect on the contracture response of coronary artery elicited by high potassium medium [58].

Moreover, decoctions made from the root of *S. miltiorrhiza* were found to be effective in reducing enhanced serum glutamic pyruvic transaminase and pathological changes in rabbits with acute liver damage induced by CCl_4 [59]. They were also reported to be effective in restoring liver function and in preventing liver fibrosis in clinical studies [60].