Therapeutic and Diagnostic Application of Epicatechin in the Treatment of Cardiovascular and Inflammatory Disorders

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Technology description

UC San Diego researchers have discovered that flavanols, epicatechin in particular, protect the heart from ischemia-mediated injury by the way of reducing infarct size. Epicatechin has also demonstrated the capacity to ameliorate various indicators of tissue damage/inflammation in injured myocardium, as well as to limit the development of late adverse ventricular remodeling. Epicatechin is potentially the first compound to be able to reduce infarct size in the acute as well as chronic stage.

Ischemic heart disease is the leading cause of death for both men and women in the U.S. as well as other industrialized countries. Infarct size is hypothesized to be a major determinant of prognosis in the treatment of ischemic injuries. Therefore there is a need for a compound that the can not only reduce the infarct size in the acute stage of myocardial infarction but also in the chronic stage.

Related Materials

Taub PR, Ramirez-Sanchez I, Ciaraldi TP, Gonzalez-Basurto S, Coral-Vazquez R, Perkins G, Hogan M, Maisel AS, Henry RR, Ceballos G, Villarreal F. "Perturbations in skeletal muscle sarcomere structure in patients with heart failure and Type 2 diabetes: restorative effects of (-)-epicatechin rich cocoa." Clin Sci (Lond). 2013 Oct 1;125(8):383-9. doi: 10.1042/CS20130023.

Ramirez-Sanchez I, Nogueira L, Moreno A, Murphy A, Taub P, Perkins G, Ceballos GM, Hogan M, Malek M, Villarreal F. "Stimulatory effects of the flavanol (-)-epicatechin on cardiac angiogenesis: additive effects with exercise." J Cardiovasc Pharmacol. 2012 Nov; 60(5):429-38. doi: 10.1097/FJC.0b013e318269ae0d.

Yamazaki KG, Taub PR, Barraza-Hidalgo M, Rivas MM, Zambon AC, Ceballos G, Villarreal FJ. "Effects of (-)-epicatechin on myocardial infarct size and left ventricular remodeling after permanent coronary occlusion." J Am Coll Cardiol. 2010 Jun 22; 55(25):2869-76. doi: 10.1016/j.jacc.2010.01.055.

Yamazaki KG, Romero-Perez D, Barraza-Hidalgo M, Cruz M, Rivas M, Cortez-Gomez B, Ceballos G, Villarreal F. Short- and long-term effects of (-)-epicatechin on myocardial ischemia-reperfusion injury. Am J Physiol Heart Circ Physiol. 2008 Aug; 295(2):H761-7. doi: 10.1152/ajpheart.00413.2008. Epub 2008 Jun 20.

Application area

These findings can potentially be used in the treatment of heart failure, acute myocardial infarction, atrial fibrillation, and inflammations in the nervous system such as neurovascular and neurological disorders. In addition, epicatechin can be used to improve the exercise capacity in patients. Lastly, genetic testing can potentially be developed, using biomarkers such as B-type natriuretic peptide, myeloperoxidase, tumor necrosis factor, uric acid, ST2, choline, interleukin-6 or fatty acid proteins, to assess individual response to epicatechin treatment.

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