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Effects of Epicatechin and its Gut Metabolites on Beta Cell Function, Survival and Proliferation

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An initiating factor of Type 2 diabetes (T2D) is beta cell dysfunction and the eventual loss of functional beta cell mass. Mechanisms that improve beta cell function could be used as a treatment for the millions of individuals with T2D. We have recently shown that the monomeric cocoa epicatechin is sufficient to enhance insulin secretion from the 832/13 INS-1 derived beta cell line and primary rat islets through upregulating the Nrf2 pathway, enhancing mitochondrial protein expression, improving mitochondrial function and ultimately enhancing beta cell ATP production. Here we present data pertaining to the larger epicatechin forms (oligomeric and polymeric epicatechin) as well as gut microbe metabolites of epicatechin (Homovanillic Acid, Hippuric Acid, 5-phenylvaleric Acid) on beta cell proliferation, survival and insulin secretion. While the monomeric form enhances insulin secretion, the oligomeric and polymeric forms inhibit insulin secretion. Interestingly, the gut metabolites of epicatechin all significantly enhance insulin secretion. These results suggest that cocoa derived monomeric epicatechin and its gut-derived metabolites could be leveraged to enhance insulin secretion as a treatment modality for patients with T2D.

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