

Role of pancreatic thyrotropin releasing hormone in directing insulin secretion to regulatory pathway

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Abstract

Thyrotropin releasing hormone (TRH; pGlu-His-ProNH₂) is colocalized in pancreatic β cells in secretory granules with insulin. TRH secretion from pancreatic islets is stimulated by glucose and inhibited by insulin. Disruption of the *TRH* gene in knockout mice results in hyperglycemia accompanied by impaired insulin secretory response to glucose. To understand role of *TRH* we blocked the last step of biosynthesis of α -amidated peptides, including *TRH* by Disulfiram (DS) treatment of adult male rats subcutaneously with 200 mg/kg for five days. *TRH* in physiological concentration (1 nM) does not affect basal insulin secretion from intact islets. In contrast, basal insulin secretion from islets of DS-treated rats is four times higher compared to controls and could not be stimulated by high-glucose. The addition of 1 nM *TRH* into medium decreased immediately basal insulin secretion in DS (*TRH* lacking) islets to control level and normalized also their response to glucose. Absence of the secretory response to glucose in islets from *TRH* depleted rats is connected with their increase of insulin content. Glucose stimulation together with 1 nM *TRH* normalized also insulin content in DS islets. Apparently, high insulin content in islets from *TRH* depleted animals is a result of block of regulatory secretion pathway which is corrected by the addition of *TRH*. In conclusion, presence of *TRH* in β cells ensures appropriate low basal (constitutive) insulin secretion and high response to stimulation. Release of *TRH* induced by glucose has autocrine effect resulting in directing insulin secretion to regulatory pathway.

Biography:

Vladimír Štrbák has worked at Institute of Experimental Endocrinology, Slovak Academy of Sciences. He was Organizer and Chairman of the five International Symposia on Hormones in Milk, resident of the International Symposium on Cell Volume and function 1997. He was Organizer and Chairman Symposium Cell Volume, physiological and pathophysiological aspects, 5th International Congress of Pathophysiology, June 28-July 1, 2006, Beijing, China, published in *Chinese Journal of Pathophysiology*, June 2006, Volume 22, No 13, Supplement p. 167. Organizer and Chairman of the session Cell Volume Regulation and Cell Functions The Physiology of Anion Transport and Cell Volume Regulation (August 3-6, 2009, Okazaki, Japan) Symposium following the IUPS Congress (Kyoto). His most important activities in last three years: 6th Global Diabetes Summit and Medicare Expo, November 02-04, 2015, Dubai, UAE, Organizing Committee Member, Keynote Speaker, 13th Global Diabetes Conference and Medicare Expo, August 8-10, 2016, Birmingham, UK: Organizing Committee Member Keynote Speaker and 16th Global Diabetes Conference and Medicare Expo, March 22-23, 2017 Rome, Italy Organizing Committee Member, Keynote Speaker, Chair of the Session

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