KSN 2020
FULLY VIRTUAL MEETING

Abstract Type : Poster
Abstract Submission No. : PO-1478

Chronic insulin infusion induces reversible glucose intolerance in lean rats yet ameliorates glucose intolerance in obese rats.

Sumit Rajput, AR Joshi
Department of Physiology, Bharati Vidyapeeth Deemed University, India

Objectives: Although insulin resistance (IR) is a key factor in the pathogenesis of type 2 diabetes (T2D), the precise role of insulin in the development of IR remains unclear. Therefore, we investigated whether chronic basal insulin infusion is causative in the development of glucose intolerance.

Methods: Normoglycemic lean rats surgically instrumented with i.v. catheters were infused with insulin (3mU/kg/min) or physiological saline for 6weeks. At infusion-end, plasma insulin levels along with glucose tolerance were assessed

Results: 6 weeks of insulin infusion induced glucose intolerance and impaired insulin response in healthy rats. Interestingly, the effects of chronic insulin infusion were completely normalized following 24h withdrawal of exogenous insulin and plasma insulin response to glucose challenge was enhanced, suggesting improved insulin secretory capacity. As a result of this finding, we assessed whether the effects of insulin therapy followed by a washout could ameliorate established glucose intolerance in obese rats. Rats were similarly instrumented and infused with insulin or physiological saline for 7days followed by 24h washout. Seven day- insulin therapy in obese rats significantly improved glucose tolerance, attributed to improved insulin secretory capacity and improved insulin signaling in liver and skeletal muscle.

Conclusions: Moderate infusion of insulin alone is sufficient to cause glucose intolerance and impair endogenous insulin secretory capacity, whereas short-term, intensive insulin therapy followed by insulin removal effectively improves glucose tolerance, insulin response and peripheral insulin sensitivity in obese rats.