Title: Insulin under hyperglycemia and hyperketonemia

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Abstract: Introduction: One of the consequences of the hyperglycemia associated with diabetes is the non enzymatic glycosylation (glycation) of proteins. Glycation leads on conformational and functional alteration of the proteins that generally bring about fibril formation. However, it is important that raising glucose concentration is accompanied by increasing of the concentrations of keton bodies (KBs) emphasizing on diabetic type 1 condition. We are presenting the effect of glucose or KB or joint presence of them on the structure and function of the insulin. 

Material: The secondary structure was assessed using CD and tertiary structure was determined using Intrinsic fluorescent and ANS. Kinetic of fibril formation were monitored with ThT.

Result: A dramatic increase in ANS fluorescence and a decrease in intrinsic fluorescence of the glycated insulin with glucose were observed. However, brief change in ANS fluorescence insulin glycated with KB or KB+Glc was seen. Rate of fibril formation in the presence of KB or KB+GL was resulted to be slower than Glc alone. Secondary structure of glycated insulin was changed in which α to β structural change was observed while KB preserved native conformation.

Discussion: Our results showed that KB retains the native structure of the insulin during glycation and make the protein less favored to form fibril but Insulin glycation in the absence of KB bring about loss of the secondary and tertiary structures to form partially folded intermediate which is the precursor for fibril formation. These intermediates are conformation that substantially associated to form insulin amyloid like fibril.

Insulin, Glycation, GLC, Ketonbody

Presentation: Poster