Serum Insulin and C-peptide Stability Over Seven Days

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Introduction
Information on stability of serum insulin is inconsistent. While RCPA Manual recommends that serum must be separated and frozen immediately, a study suggested that this was not necessary if analysis was performed within 24 hrs.1 For C-peptide, it is generally considered stable at room temperature for 24 hours. Information on stability of insulin and C-peptide stored at 2-8°C beyond 24 hrs is inconsistent. To facilitate add-on requests, we evaluated the stability of serum insulin and C-peptide stored in the fridge for up to seven days for our method.

Methods
Blood was collected from 15 laboratory staff into serum tubes and processed within two hours. After centrifugation, one aliquot of serum was measured immediately for insulin and C-peptide (both on e602, Roche), while multiple sets of aliquots were stored in the fridge for up to seven days for subsequent analysis on day 2 (typically 24-30 hrs), day 3, day 4 and day 7. A separate set of specimens were used for each run. Significant analytical change was defined as initial value ±2.77CVa (insulin CVa=2.9%; C-peptide CVa=2.0%).

Results
An analytically significant decrease of 20.7% in the mean insulin concentration from baseline was observed in day 2 (mean ± SD: 15.3±13.7 vs 12.0±11.6 µU/mL, respectively, p<0.05). Interestingly, insulin concentration remain unchanged (p>0.90) from day 2 to day 7 (Figure 1).

For C-peptide, an average decrease from 5.4% to 11.8% was observed from day 2 to day 7 respectively. The changes were not analytically significant until day 3 (Figure 2).

Discussion and Conclusion
Insulin appeared to be unstable in the first 24 hrs, presumably due to degradation in pro-insulin. Previous studies have shown that pro-insulin in serum is unstable2 and the Roche kit insert for the insulin assay reported to have a 32.5% cross reactivity with pro-insulin. Insulin assays that do not cross react with pro-insulin may be stable over seven days.

Serum Insulin using the Roche method would result in a reduction of 20-25% for add-ons up to seven days. Add-ons for serum C-peptides are analytically acceptable for up to three days.

References