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Analysis of Physiological Amino Acids for Clinical Diagnosis on the Hitachi L-8900 Amino Acid Analyzer

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Demands for analysis of amino acids that induce metabolic errors continue to exist. Model L-8900, the latest generation in a long line of Amino Acid Analyzers from Hitachi, is a dedicated system capable of simultaneously identifying and quantifying fifty (50) physiological amino acids for the purpose of clinical diagnosis. Unparalleled performance is achieved via a high-resolution 3 µm ion exchange resin, a patented reaction column to eliminate band broadening, and a unique ninhydrin delivery system with no pre-mixing required. The same system configuration can also be used to analyze amino acids related to specific metabolic errors in a shortened time.

Discussion

A total of 50 amino acids relevant to metabolic errors can be analyzed in a single acquisition using current methodology on the L-8900 Amino Acid Analyzer (Figure 1). Notable amino acids include homocysteine, homocitrulline, allo-isoleucine, argininosuccinic acid, cysteine-homocysteine mixed disfulfides, homocystine, argininosuccinic acid anhydride, and aminoethylcysteine (internal standard). Using the same system and column configuration, key amino acids related to certain metabolic errors can be targeted and analyzed in a shortened amount of time. For example, in only 26 minutes, it is possible to analyze eight amino acids for simultaneous screening of Maple Syrup Urine Disease (MSUD) (valine, allo-isoleucine, isoleucine, and leucine), Phenylketonuria (PKU) (tyrosine and phenylalanine), Hypermethioninemia (methionine) and Cystathioninuria (cystathionine). Acetyl-lysine is used as an internal standard (Figure 2). It is also common to target only tyrosine and phenylalanine for the monitoring of nutrition therapy in Phenylketonuria patients. This can be accomplished in only 10 minutes (Figure 3).

Conclusion

Hitachi High Technologies America continually strives to provide the most technologically advanced solutions to the life science industry. One example of this dedication is the Hitachi L-8900 Amino Acid Analyzer's capability for analyzing 50 physiological amino acids that induce metabolic errors. Since all of the above analyses employ the same column, buffers, and reagents, the system can be programmed to switch automatically among them during a series of acquisitions for optimal system flexibility.

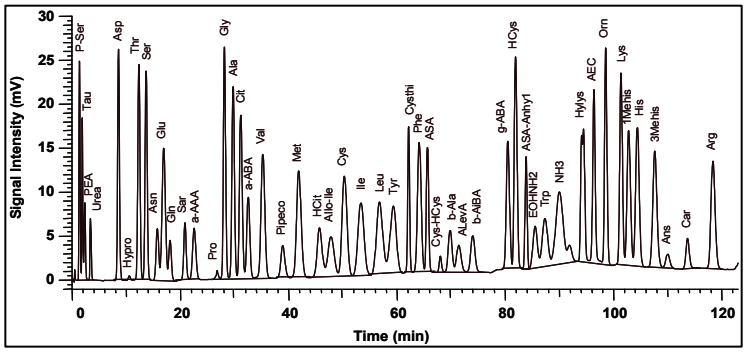

Figure 1: Chromatographic separation of 50 physiological amino acids on the Hitachi L-8900 Amino Acid Analyzer.

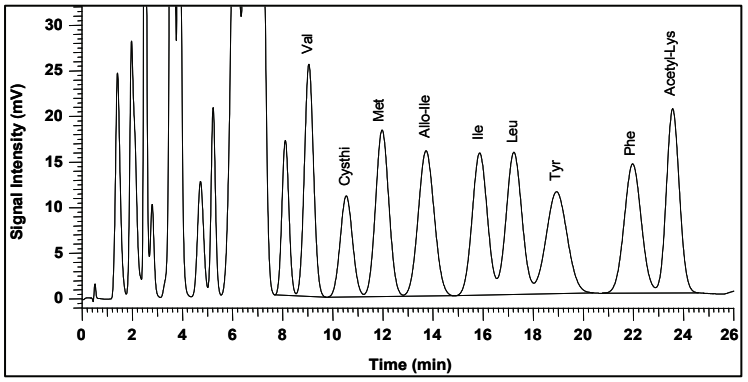

Figure 2: Chromatographic separation of eight key amino acids in only 26 minutes for diagnosing a variety of metabolic disorders.

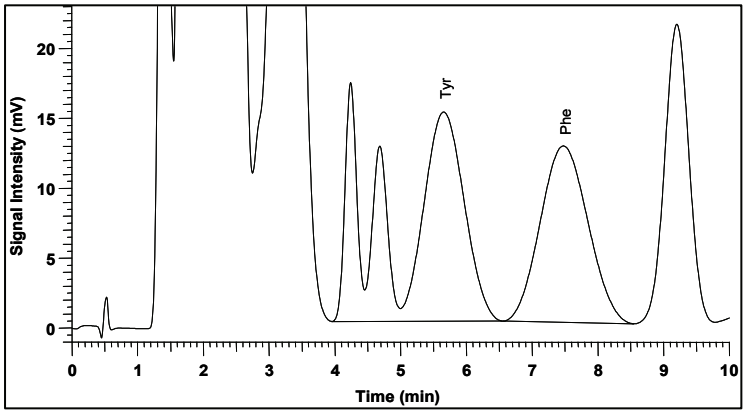

Figure 3: Chromatographic separation of Tyrosine and Phenylalanine in only 10 minutes for monitoring nutrition therapy in PKU patients.

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