Peptide hormones in blood

Measuring peptide hormones in blood is not an easy task. Not only are they present at trace levels (nanomolar to picomolar), but they are surrounded by a multitude of other compounds. Immunoassays have been used for such analyses, but they suffer from cross-reactivity with similar target analytes, and data can only be obtained on one analyte per assay. To overcome these limitations, James W. Jorgenson and H. Zhang of the University of North Carolina–Chapel Hill have turned to a completely different approach: comprehensive LC/CE.

The method should be capable of analyzing 20–30 peptide hormones simultaneously from a single drop of blood. What makes it all possible is a two-dimensional (2-D) separation, in which reversed-phase capillary LC is followed by CE with laser-induced fluorescence detection. For a 6-μL sample, the LC/CE separation takes about 4 h.

"The complexity of the mixture turns out to be the limiting factor," says Jorgenson. To simplify the mixture, the researchers use size-exclusion chromatography before the 2-D separation to reduce the levels of larger proteins and small amines and amino acids. The peptides were then fluorescently labeled with tetramethylrhodamine isothiocyanate (TRITC).

Amine impurities in buffers and solvents, and impurities in the TRITC reagent itself, cause interference with the detection of peptide hormones, says Jorgenson. Although the manufacturer of the TRITC claims that it can be used with methanol, Jorgenson's group showed that TRITC reacts with the methanol, creating a product that is no longer active in tagging amines. Using LC and electrospray ionization MS, they found that, in the presence of methanol, the concentration of TRITC gradually decreased with time, while the concentration of the inactive product increased with time. The researchers were able to clean up the TRITC by running it through a reversed-phase LC separation in an acetonitrile–water solvent system.

NEWS FROM PITTCON 2000

The staff of *Analytical Chemistry* reports from New Orleans, LA.

Instrument companies get chummy

Although alliances between instrument companies are nothing new, this year's Pittcon seemed to be dominated with partnerships between rival manufacturers, including some that would have been unthinkable several years ago. The driving force is the lucrative drug discovery and biotechnology markets, whose demands are so complex that it seems individual manufacturers cannot handle them alone.

High on the list of significant new partnerships was the announcement that Agilent Technologies (formerly Hewlett-Packard) and PE Biosystems (through its Sciex division) had formed a joint venture to couple their LC and triple-quadrupole mass spectrometer, respectively. Agilent's LC was also coupled to a Bruker Daltonics ion-trap mass spectrometer (LC/MS); an NMR (LC/NMR); and, in what was the probably the most sophisticated hyphenated instrument, an NMR and a mass spectrometer (LC/NMR/MS). Waters also got in on the LC/NMR action, announcing a collaboration with Bruker to couple Waters' LC systems for drug discovery with Bruker's NMR. In an effort to broaden their portable instrument capabilities, PerkinElmer teamed up with SensIR Technologies to market a field-portable FT-IR system.

Not to be outdone, ThermoQuest announced alliances with Beckman Coulter (CE/MS/MS), Dionex (LC/MS and ion chromatography/MS), and Gilson (fraction collectors for LC/MS). ThermoQuest also announced an "old-fashioned" partnership—it acquired U.K.-based HD Technologies, a developer of time-of-flight systems.

Thermo spins in reverse

As if the recent spate of instrument company reorganizations hasn't been enough, now comes word that Thermo Electron is reversing its strategy of spinning out companies and pulling them back into the parent. Many of the companies to be retrieved are analytical instrument manufacturers originally spun out from Thermo Instrument Systems, a child company of Thermo Electron. Ironically, the announcement comes about 1 year after rival manufacturers Hewlett-Packard and Varian Associates spun out companies of their own.

For about 15 years, Thermo Instrument Systems has been acquiring analytical instrument companies and repackaging them into small "Thermo-sized" companies (*Anal. Chem.* **1996,** *68,* 184 A–189 A). For example, Finnigan and Nicolet have been incorporated into ThermoQuest and Thermo Optek, respectively. Each new company was accompanied by a public offering of stock, with the parent Thermo company holding a majority of the shares.

However, the number of shares being offered was, by Wall Street standards, pretty small. "Many companies have less than 5 million shares of stock outstanding," says Richard Chapman, president and CEO of ThermoQuest. "ThermoQuest, for example, has 10 investors who own around 3.7 million shares, and they won't sell." The result is that Thermo has not enjoyed the recent technology