

Seventh International Symposium on Mass Spectrometry in the Health and Life Sciences  
21<sup>st</sup>-25<sup>th</sup> August 2005  
San Francisco, CA

The Seventh International Symposium on Mass Spectrometry in the Health and Life Sciences (possibly the longest conference name in the world, ever) was held at the Fairmont Hotel on the top of Nob Hill, one of San Francisco's most exclusive neighbourhoods. 270 delegates attended: around 80% were from the US, but the remaining 20% were from all over the world, including Europe, Australia, China, Japan and Israel.

The conference proper was preceded by a one-day Mini-Symposium on electron capture dissociation (ECD) and electron transfer dissociation (ETD). Speakers included Fred McLafferty, Neil Kelleher, John Syka and Roman Zubarev. Peter O'Connor described the use of ECD for distinguishing aspartic and isoaspartic acid residues. The isomerisation of aspartic acid residues to isoaspartic acid is implicated in many diseases, including Alzheimer's and Type II diabetes. But, due to their isomeric nature, they are difficult to differentiate in proteins and peptides by mass spectrometry. ECD, however, cleaves the N-C $\alpha$  bond, and isoaspartic acid doesn't have one of these. The resulting differences in the ECD spectra of aspartic and isoaspartic acid-containing peptides can be used to differentiate the two residues.

The conference program was organised so that invited plenary and keynote speakers talked, in a single session format, until mid-afternoon, followed by poster sessions featuring work submitted by participants. Highlights for me included Daryl Pappin's presentation on quantitative MS using iTRAQ and R. Graham Cooks' talk on desorption electrospray ionisation (DESI), one of the most exciting developments in MS in recent years. DESI, in which an electrosprayed solvent is directed at a sample surface, allows the liberation of ions from almost any surface (e.g. polymers, paper, metal, ice, stone, tissue...) under ambient conditions. Analytes range from small organics to large biomolecules, including non-polar as well as polar and ionic molecules. The type of analyte observed is determined by the spray conditions so, for example, it is possible to detect drug metabolites on skin without interference from the lipids present. Reactive DESI was also described, in which reagents added to the solvent spray can bind to molecules on the surface, producing adduct ions. Keith Baggerly presented some cautionary tales regarding experimental design and the statistical analysis of proteomics spectra, in particular when searching for biomarkers for disease. He highlighted a number of studies, some of which have been published, where classification patterns identified to distinguish cancer patients from healthy individuals could actually be attributed to experimental factors such as sample run order or spectral processing. Key messages for good experimental design were a well defined hypothesis, adequate sample size, consistent collection protocol and randomisation at every stage.

The poster sessions provided the chance for discussion and networking with the other delegates. The atmosphere was very relaxed and it was easy to approach other delegates with questions and requests for advice. My poster on the relative quantification of

cytochrome P450 proteins using  $^{18}\text{O}$  stable isotope labelling seemed to be well received, and I came away with many useful ideas about how to proceed with my research.

This was a mass spectrometry conference, and as such the majority of delegates were MS users, yet it struck me that many of my colleagues in the health and life sciences who do not work with MS would also have very much enjoyed attending. Discussions of methodological advances were juxtaposed with presentations from biological perspectives, describing their utility in solving complex biological problems; for example, George Stark's plenary lecture on the first day was entitled 'Unravelling complexity in cytokine-dependent signalling: how can mass spectrometry help?'. It would have been very useful for life-science researchers outside the MS field to see just how many, varied and widespread are the applications of MS in the health and life sciences, and to realise the potential it could hold for their own work. I guess it's up to me to spread the word!