



John Bennett Fenn

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John Bennett Fenn, who shared the 2002 Nobel Prize for Chemistry, died on December 10, 2010 aged 93. Born in New York City on June 15, 1917, he graduated in 1937 from Berea College in Kentucky and earned a Ph.D. in Chemistry from Yale University in 1940. He then worked in industry (Monsanto, Sharples Chemical, and Experiment Inc) until 1954, when he was appointed as the director of an Office of Naval Research Project administered by Princeton University; some years later he became Professor in Princeton's Department of Engineering. In 1967, he moved to Yale University as Professor in the Department of Engineering and Applied Science, where he did his groundbreaking work in electrospray ionization (ESI). In 1994, he became a Research Professor at Virginia Commonwealth University, remaining there until his death.

John is gone, but he will be forever in our minds for having introduced ESI, the marvelous ionization technique that revolutionized mass spectrometry (MS). ESI brought MS from the exotic gas-phase environment of small molecules and ions down into the "real world" of nearly all types of ions and molecules in solution. ESI has provided a solid MS bridge, connecting gas-phase to solution chemistry and vice-versa: ions in solution can be ejected to the gas phase for MS analysis, and new reactions discovered using gaseous ions can be tested by ESI in solution. Therefore, anything that can be dissolved and charged in solution becomes analyzable by ESI-MS. "Elephant" molecules, such as proteins and polymers or even more massive species such as intact viruses and bacteria, are then given "wings" to fly to mass spectrometers. The benefits of ESI to scientific investigations rapidly followed, and applications of ESI-MS grew explosively. Two decades later, we are still discovering new applications of ESI for doing science. ESI is now the gold standard technique from proteomics to petroleomics and drug analysis and is being used in countless studies in (bio)chemistry and in the pharmaceutical and medical sciences. As its main benefit, perhaps, and as the Swedish Royal Academy of Sciences described it, ESI "...has led to increased understanding of the processes of life".

Other previously inaccessible chemicals, such as organometallics, dyes, polymers, and sugars, were also saved from MS obscurity by ESI. In catalysis and organic synthesis, ESI has allowed reactions in solution to be monitored by fishing out their transient intermediates, now loaded with charged wings, providing us with molecular eyes with swimming goggles to follow reaction mechanisms. Ambient MS, the second and contemporary MS revolution, was also pioneered by Fenn through

such offspring techniques as desorption ESI (DESI), secondary ESI (SESI), and paper spray. The relevance of ESI can be judged by its tremendous impact on the instrumentation market, which is on the scale of many billions of dollars!

John Fenn's pathway to the Nobel Prize is also enlightening: He did not constrain himself to a specific field but played continuously with physics, chemistry, and engineering, moving back and forth from industry to academia. His multidisciplinary knowledge acquired on "side-line" scientific fields, such as reactions in flames, jet propulsion, and molecular beams ("a boring chore with few redeeming features" as he described it) was, together with his gifted mind, crucial for Fenn to conceive the unimaginable—a way to evaporate ions from solutions—a task that nearly all of us had considered and thought impossible.

But John B. Fenn, the Nobel Prize winner was, before and after, a modest and warm man with a kind soul who was willing to discuss passionately science and life with everyone. He also cleverly recognized that above all, science must be fun, and that it is better to learn how to think than how to accumulate information. "Teach them how to think" was John Fenn's recommendation to teachers. I will always remember the very warming "yes" I got from John when I invited him to be the plenary lecturer of the 1st Brazilian MS conference in 2005. Unforgettable are also the memories of the joy of first BrMASS participants in hugging him, talking with him, guiding him back to his hotel room and laughing at his irreverent jokes: for instance, when he slept and fell from his chair, blaming the speaker for a tedious lecture. Picture time came and a long line with hundreds of young scientists was formed, and John was there for hours smiling, talking, and taking pictures with us all!

In his Nobel lecture, Fenn described ESI as "wings for molecular elephants". ESI in fact gave "wings for mass spectrometry," freeing it from the restricted world of small molecules and allowing it to reach nearly any type of molecules wherever they may be in the molecular universe. Thomson established the foundations of MS, but Fenn took it to the "masses" (all of us who do science), making MS more popular than ever! Mass spectrometry is now divided in two eras: before and after John Bennett Fenn.

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