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Original mass spectrum taken from Käll, L. *et al.*, *Nat. Methods* **4**, 923–925 (2007).

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Nature Milestones are special supplements that aim to highlight the outstanding technological developments and scientific discoveries that have helped to define a particular field. *Nature Milestones in Mass Spectrometry*, a collaboration between five Nature Publishing Group journals, presents a historical look back at the key technical developments in mass spectrometry and the chemical and biological applications that stemmed from these advances. Each short Milestone article, written by a Nature Publishing Group editor, covers one breakthrough, highlighting the main papers that contributed to the advance and discussing both their value at the time and their lasting influence on mass spectrometry today.

The Milestone topics and papers were selected with the help of expert advisers, but the ultimate decisions on what to include were made by the editors. *Nature Milestones in Mass Spectrometry* is not meant to be a comprehensive overview of this field, and despite our and the advisers' best efforts, omissions of important literature are inevitable. Our intent is to give readers a taste of the key advances in this technique, with a special focus on biological and biomedical applications, areas in which much of the research using mass spectrometry is currently concentrated.

The seeds of mass spectrometry were planted just over a century ago with the pioneering work of physicist J.J. Thomson (see **Milestone 1**). The development of ionization methods (**Milestone 2**) and instrumentation (see **Milestones 4–6**) was fueled in part by the Manhattan Project during the Second World War. The first applications of mass spectrometry in the field of chemistry were reported soon after, and to this day, mass spectrometry serves as a workhorse technique for molecular and elemental analysis in laboratories worldwide (see **Milestones 3, 7, 10 and 12**).

The development of the soft ionization techniques of electrospray ionization (**Milestone 15**) and matrix-assisted laser desorption/ionization (MALDI; **Milestone 18**), and also of tandem mass spectrometry (**Milestone 13**) and of the combination of chromatographic separation with mass spectrometry (**Milestone 8**), further revolutionized the field, allowing mass spectrometry to become an essential tool not just in chemical research but also in the biological arena. Today, mass spectrometry is the central technology employed in the field of proteomics (**Milestone 20**), enabling the analysis of post-translational modifications (**Milestone 21**) and protein interactions (**Milestone 22**), and it is also as an important tool in structural biology (**Milestone 19**).

The supplement includes a Timeline that lists the key developments (by the year in which the first milestone paper pertinent to each breakthrough was published), a reprinted Commentary from *Nature Methods* and two reprinted Reviews from *Nature* (these articles will be made freely available online until March 2016). The Milestones website also includes an extensive Library listing of mass spectrometry-related papers published in Nature Publishing Group journals.

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