Abstract

Farnesylated proteins are important in transduction of signals in cell and therefore can figure in development of many diseases, mainly cancer. Electrospray mass spectrometry is a widely used method in analysis of peptides and proteins, thus it was chosen as a method to develop a simple way to detect farnesylated proteins in cell. A cleavage pattern of these proteins, when subjected to MS/MS, was found on examples of synthetically farnesylated simple peptides and bovine albumin. Distinctive features of MS/MS spectra of these peptides are two peaks, which both represent the virgin peptide fragment after the farnesyl moiety was cleaved off. These fragments have a different charge, because they originate from different type of cleavage. Homological cleavage of the bond between the farnesyl and sulfur leads to formation of a new charge on the peptide fragment, while the leaving farnesyl is also charged and has amu of 205. Second type of fragment rises from neutral loss of farnesyl moiety, there is no new charge generated on the peptide fragment and the amu of the leaving farnesyl moiety is 204, because it looses one of its hydrogen in favor of the peptide. This knowledge can be applied also to more complicated protein samples prepared from cells. When searching for farnesylated proteins in such a sample made from cell membrane proteins of breast cancer cells a new problem occurred and greatly complicated the determination – the proteins were in such a low concentration that it was immensurable. Therefore a method to obtain these proteins from cells in a satisfactory concentration has to be developed.

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