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研究论文

蛋白质辅助基质提高激光解吸/电离多肽离子化率和绝对强度的研究

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摘要

人血清转铁蛋白(Human serum transferrin, HTF)、牛血清白蛋白(Bovine serum albumin, BSA)、鲨鱼肝铁蛋白(*Sphyrna zygaena* liver ferritin, SZLF)、马脾铁蛋白(Horse spleen ferritin, HSF)均能辅助基质提高激光解吸/电离胰岛素(Insulin, INS)和海兔酸性多肽(*Aplysia* acidic peptide, AP)离子化率和质谱峰的绝对强度(简称为绝对强度), 其中绝对强度分别提高10和4倍, 这一现象不依赖于INS浓度, 而与蛋白质类型和结构有关. SZLF和脱铁核SZLF(apoSZLF)辅助基质提高INS绝对强度的能力几乎相同, 蛋白质中的金属离子含量对这种效应无明显影响, 主要取决于蛋白质的氨基酸组成与结构. 采用胶内酶解和肽指纹技术(PMF)鉴定HTF过程中, 发现基质中分别添加SZLF, apoSZLF和HSF后, HTF肽片段质谱检测的质谱峰数目及绝对强度均有明显增加, 进一步提高了数据库鉴定HTF的可信度.

关键词 MALDI-TOF MS 多肽 绝对强度 辅助基质 肽指纹图谱

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Ionization Rate and Absolute Intensity of Peptides Enhanced with Matrix-assisted Laser Desorption/Ionization in the Presence of Proteins

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Abstract Human serum transferrin(HTF), bovine serum albumin(BSA), and horse spleen ferritin (HSF) have capacities of assisting the matrix to enhance ionization rate and absolute intensity both insulin(INS) and *aplysia* acidic peptide(AP) by laser desorption/ionization, and this enhancement can be up to 10 and 4 times, respectively. This phenomenon was independent on the concentration of INS, but dependent on these intensifiers strongly. Moreover, the similar enhancing rate of absolute intensity of INS was observed by both SZLF- and apoSZLF-assisted matrix, indicating that this effect was not relative to the metal ions of proteins, but their compositions and structures. The fragment numbers of HTF lysised with endopeptidease and matching rate with reference transferrin were greatly improved in the presence of SZLF, apoSZLF and HSF, when HTF was identified by a combined techniques, lysis enzyme and peptide mass fingerprinting(PMF). This novel effect might play an important role in enhancing the reliability for identifying protein.

Key words MALDI-TOF MS; Peptide; Absolute intensity; Protein-assisted matrix; PMF

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