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(57) Abstract: A method for determining the concentration and modifications of apolipoprotein in biological samples including plasma, serum, and lipoprotein fractions, by obtaining a sample from a patient, adding a specific volume of an internal standard to the sample, applying the sample to a surface-enhanced, Protein G-coated, antibody-bound chip and removing unbound sample components, analyzing the sample by mass spectrometry, determining the concentration of the apolipoprotein using values of internal standards, and evaluating the concentration of the apolipoprotein, its isoforms, amino acid substitutions and modifications for use as a tool for diagnosing diabetes, stroke, stress, Alzheimer's disease, and cardiovascular diseases (for example, lipid disorders, metabolic syndrome, obesity, atherosclerosis, etcetera).