

## Human serum lipoprotein zeta potential measurement by zetasizer instrument, a method development

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**Background and Aims:** Serum lipoproteins play a central role in transporting hydrophobic molecules through the bloodstream and between specific tissues. Lipoprotein molecules have a distinctive electrical charge and changes in electrostatic properties directly affect the metabolism of the lipoprotein. Zeta potential has an important role in lipoproteins structure and their interaction with apolipoproteins and enzymes. So determination of lipoproteins zeta potential can help to better understanding of pathogenesis and prognosis of lipid metabolism related diseases. There are some methods such as agarose gel electrophoresis and spin-probe technique to evaluate the lipoprotein zeta potential, but these methods are complicated and not quiet reliable and their reported values are variable in different articles. The aim of this study is to provide a standard operating protocol to measure lipoprotein zeta potential by zetasizer.

**Methods:** Plasma lipoproteins were isolated by sequential ultra-centrifugation from pooled plasma of 20 volunteers, the lipoprotein zeta potential was detected by laser doppler velocimetry (LDV) technique by zetasizer instrument.

**Results:** The effects of ionic strength, temperature and pH of dispersant and the concentration of lipoprotein on zeta potential values were evaluated. Finally 0.2 mM tris buffer with pH of 7.4 at 25°C were used to determine zeta potential in all measurements. Protein concentration for VLDL, LDL and HDL was 35, 64 and 20 µg/ml respectively. The detected values for VLDL, LDL and HDL zeta potential with 10 separate analyses were  $-36 \pm 5$ ,  $-25.2 \pm 1$  and  $-36 \pm 4$  mv respectively.

**Conclusions:** Using this method makes it possible to evaluate the values of lipoprotein zeta potential in different physiological and pathological conditions and also in different populations. Also the effects of different factors such as drugs, macromolecules and trace elements on lipoprotein zeta potential can be monitored before and after exposure on the same sample of lipoprotein invitro.

**Keywords:** Zeta potential; Lipoprotein; Zetasizer