S42-2 A analytical method for the detection of protein reversible chenge in blood and the application to healthcare and clinical examination

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Human serum albumin (Alb) exists in both reduced and oxidized forms, and the percentage of oxidized albumin increases in several diseases. The ratio of oxidized Alb (Alb(ox)%) increased in hepatic cirrhosis and BCAA administration could be lower the Alb(ox)%. However, little is known regarding the pathophysiological significance of oxidation due to poor characterization of the precise structural and functional properties of oxidized Alb. Here, we characterize both the structural and functional differences between reduced and oxidized Alb. Using LC-ESI-TOFMS and FTMS analysis, we determined that the major structural change in oxidized Alb in healthy human plasma is a disulfide-bonded cysteine at the thiol of Cys34 of reduced Alb. We demonstrated several differences in functional properties of Alb including protease susceptibility, ligand-binding affinity and antioxidant activity. From these observations, we conclude that an increased level of oxidized Alb may impair Alb function in a number of pathological conditions. Furthermore, we developed the new method which could inhibit the reversible Alb conversion between reduced and oxidized forms, and allow precise and reliable Alb(ox)% value measurements in clinical samples.