Most human intervention studies have examined the effects on a subset of risk factors, some of which may require long-term exposure. The plasma proteome may reflect the underlying changes in protein expression and activation, and this could be used to identify early risk markers. The aim of the present study was to evaluate the impact of regular fish intake on the plasma proteome. We recruited thirty healthy men aged 40 to 70 years, who were randomly allocated to a daily meal of chicken or trout raised on vegetable or marine feeds. Blood samples were collected before and after 8 weeks of intervention, and after the removal of the twelve most abundant proteins, plasma proteins were separated by two-dimensional gel electrophoresis. Protein spots <66 kDa with a pI >4.3 visualised by silver staining were matched by two-dimensional imaging software. Within-subject changes in spots were compared between the treatment groups. Differentially affected spots were identified by matrix-assisted laser desorption ionisation-time of flight/time of flight MS and the human Swiss-Prot database. We found 23/681 abundant plasma protein spots, which were up- or down-regulated by the dietary treatment (P<0.05, q<0.30), and eighteen of these were identified. In each trout group, ten spots differed from those in subjects given the chicken meal, but only three of these were common, and only one spot differed between the two trout groups. In both groups, the affected plasma proteins were involved in biological processes such as regulation of vitamin A and haem transport, blood fibrinolysis and oxidative defence. Thus, regular fish intake affects the plasma proteome, and the changes may indicate novel mechanisms of effect.
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