OBJECTIVES: To investigate the relation between (1) cardiorespiratory fitness and plasma saturated, monounsaturated and polyunsaturated fatty acids and (2) the interactions between cardiorespiratory fitness, dietary fat intake and plasma fatty acid composition. DESIGN: Cross-sectional analysis. SETTING AND SUBJECTS: The subjects were randomly selected, 127 middle-aged Finnish men participating in the DNACOS exercise intervention study. INTERVENTIONS: Cardiorespiratory fitness was determined spiroergometrically, dietary intake of macro- and micronutrients by 4-day food records and plasma fatty acids by gas chromatography. The subjects were divided into tertiles of aerobic fitness. RESULTS: Differences between fitness tertiles were not observed for dietary intake of total fat, and saturated, monounsaturated or polyunsaturated fatty acids (percent of total energy). In contrast, plasma saturated fatty acids were significantly lower (P<0.01) and polyunsaturated fatty acids significantly higher (P<0.05) in the highest fitness tertile compared to the lowest tertile. Dietary saturated fat intake was positively associated with plasma saturated fatty acids (r=0.342; P<0.05) and inversely with plasma polyunsaturated fatty acids (r=-0.453; P<0.01) only in the lowest fitness tertile. In addition, a positive correlation between body mass index and plasma saturated fatty acids (r=0.516; P<0.01) as well as a
negative correlation between body mass index and plasma polyunsaturated fatty acids ($r=-0.516$; $P<0.01$) was observed in the lowest tertile solely. CONCLUSION: Different levels in cardiorespiratory fitness are associated with different levels in plasma saturated and polyunsaturated fatty acids and lead to modifications in the association between dietary and plasma fatty acids. These findings can perhaps be explained by a reduced hepatic fatty acid and lipoprotein synthesis as well as by an enhanced muscular lipid utilization, which are commonly seen in those who are physically active and who exhibit a higher level of fitness.