A Biochemical approach to Peroxisomal disorders

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Peroxisomes have an indispensable role in cellular metabolism (Wanders et al, 2001). Peroxisomal disorders are characterized by abnormal pathogenesis (Moser, 1999), and metabolically by accumulation of VLCFAs, phytanic- and pristanic acids. The estimation of these metabolites in plasma is therefore the recommended firstline test for diagnosing patients (Korman et al, 2000).

We describe here the implementation of the GC-MS based method by Vreken et al., 1998 in our laboratory for the quantitative detection of VLCFAs, phytanic- and pristanic acids. The simplified preparation procedure over previously described methods combined with excellent quantitative properties makes this approach to fatty acid analysis one of choice. The incorporation of stable isotopes facilitates very accurate analysis of especially low concentration metabolites. Using this method 3 patients with characteristic clinical symptoms were diagnosed with peroxisomal disorders. The very long chain C24:0/C22:0 and C26:0/C22:0 ratios are between (0.82 0.89) and (0.017 0.028) respectively, with an average of 0.848 for C24:0/C22:0 and 0.022 for C26:0/C22:0. The ratios of 8 controls are between (0.386 0.496) for C24:0/C22:0 and (0.0034 0.0177) for C26:0/C22:0, with an average of 0.432 for the C24:0/C22:0 ratio and 0.008 for the C26:0/C22:0 ratio. Phytanic- and pristanic acid concentration in these cases were within normal limits (0.3 11.5 for phytanic acid and 0.0 - 1.5 for pristanic acid). The control values reported here are in good agreement with those mentioned in the literature.

Secondary to the primarily metabolic disturbance is the excretion of dicarboxylic acids. The excretion of these are still under investigation, but high C10/C6 ratios may give an indication of peroxisomal disorders (Yamaguchi et al, 2001).

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