

**Measurements of serum-free thyroid hormone concentrations
by ultrafiltration
— a comparison with equilibrium dialysis and mathematical calculation —**

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An ultrafiltration method (UF) for measuring free thyroxine (FT₄) and free triiodothyronine (FT₃) using the Diaflow YM membrane (Centricon-10) is described. The results are compared with those by equilibrium dialysis (ED) and also by mathematical calculations derived from T₄, T₃, and binding protein concentrations. The precision with the UF method was excellent. The normal ranges of FT₄ and FT₃ by the three methods are all comparable. There was a high degree of correlation of FT₄ or FT₃ results by UF with those by ED and by calculation ($r=0.940-0.974$, $n=161$, $P<0.001$). FT₄ and FT₃ by all methods agreed well for hyperthyroidism, hypothyroidism, and for patients with low T₄-binding globulin. The mean FT₃ in pregnancy was lower than the normal value for all methods, and FT₄ concentrations by UF and calculation also decreased in late pregnancy. The mean FT₄ by UF and ED in low T₃ syndrome were significantly higher than in the normal controls, while the calculated FT₄ was lower. The FT₃ in low T₃ syndrome distributed normal to subnormal in all methods. These results indicate that a) the UF method is a reliable reference method for measuring FT₄ and FT₃ concentrations; b) the UF results agree well with those by ED and also with theoretically derived values in subjects with thyroid diseases and TBG abnormalities; c) for patients with low T₃ syndrome, the FT₄ results obtained by UF and ED are similarly discrepant from the calculated results, implying the existence of binding inhibitor(s) which affect both UF and ED measurements.

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