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AGE-RELATED CHANGES IN FREE PLASMA TESTOSTERONE, DIHYDROTESTOSTERONE, AND OESTRADIOL

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The age-related changes of free plasma testosterone (T), dihydrotestosterone (DHT) and oestradiol (Oe_2) were studied in 82 healthy adult males. 46 subjects were between 22 and 61 years (group I), 36 between 67 and 93 years (group II).

The percentage of free, not protein-bound hormone was determined by equilibrium dialysis of undiluted plasma against isotonic phosphate buffer at 37°C. Total hormone concentrations were measured by radioimmunoassay.

The percentage of free T was 2.24% (median), 1.65—3.42 (95 percentiles) in group I and 1.65% (1.24—2.26) in group II. The percentage of free DHT decreased from 1.17% (0.80—2.03) in group I to 0.83% (0.52—1.55) in group II. The decrease of the percentage of free Oe_2 was only very small: group I = 2.49% (2.13—2.96), group II = 2.31% (1.95—3.17).

The fall of free T by 43.3% from 12.2 ng/100 ml (6.74—25.0) in group I to 6.90 ng/100 ml (3.57—10.6) in group II was twice as high as that of total T which decreased on the average by 20.6%. Free DHT decreased by 25.8%: group I = 578 pg/100 ml (266—987), group II = 429 pg/100 ml (168—723), while total DHT was not significantly different between both groups (—1.9%). Free Oe_2 was increased in old age: group I = 42.4 pg/100 ml (26.0—69.4), group II = 55.7 pg/100 ml (35.8—118.9). The increase of free Oe_2 by 31.4% was almost as high as that of total Oe_2 (46.9%).

In conclusion:

1. The increase of specific binding in old age causes a much smaller fall of total T than of the free hormone concentration.

2. The higher binding explains that, despite of falling free DHT concentrations, total plasma DHT is unchanged in old age.

3. The increase of Oe_2 in old age cannot be explained by higher binding to TeBG.