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II. Medizinische Klinik der Universität München, Germany

EFFECT OF ACTH INFUSION TESTS ON CORTISOL-4-¹⁴C BINDING TO PLASMA PROTEINS

M. Müller-Bardorff, W. Hochheuser, K. Schwarz and P. C. Scriba

Binding of cortisol-4-¹⁴C (0.03 µg = 0.028 µc per ml) to plasma proteins was studied by dextran gel filtration (Sephadex G-10 columns, h = 18 cm, r = 0.4 cm). After incubation (15 min.; 37°C) of plasma samples from 10 controls taken at 9 a.m. 90.6 ± 2.1 (mean ± S.D.) of cortisol-4-¹⁴C (normal range: 86.4–94.8 %) were found to be protein-bound, and 9.5 ± 2.3 % (4.9–14.1 %) determined as retained on dextran gel columns. The latter could be eluted by washing the columns with 2 ml control serum and is called "free" cortisol. Plasma "11-OHCS" as determined according to *Mattingly* (1962) were 12.5 ± 3.5 µg/100 ml (5.5–19.5 µg/100 ml).

Incubation of plasma from patients (n = 10) with primary adrenal insufficiency showed 97.4 ± 0.7 % (mean ± S.D.) of cortisol-4-¹⁴C protein-bound and 2.6 ± 0.7 % "free" cortisol (significance against controls = p < 0.0005).

"11-OHCS" of these patients were 4.5 ± 2.6 µg/100 ml (p < 0.0005). Thus diagnosis could be made more readily from dextran gel filtration data than from "11-OHCS" values, since the former showed no overlap with controls. Facilitation of diagnosis was especially helpful in borderline cases. — Three patients with Cushing's syndrome had "11-OHCS" values of 40.0 µg/100 ml; 27.0 µg/100 ml and 25.5 µg/100 ml. Bound cortisol-4-¹⁴C values of 38.4 %, 65.1 % and 46.9 % were found; the "free" cortisol-4-¹⁴C was 61.6 %, 34.9 % and 53.1 %.

Good correlation between the plasma levels of "11-OHCS" and the binding of cortisol-4-¹⁴C was also found when plasma was taken before and after ACTH infusion (25 IU from 9 a.m. to 1 p.m.):

		First Day		Second Day	
		9 a.m.	1 p.m.	9 a.m.	1 p.m.
Controls. 10 Pat.	"11-OHCS" µg/100 ml	12,5 ± 3,5	49,3 ± 12,5	15,8 ± 6,3	56,3 ± 12,3
	bound F %	90,6 ± 2,1	35,6 ± 4,5	87,8 ± 9,0	32,3 ± 3,9
	"free" F %	9,4 ± 2,3	64,3 ± 4,7	12,2 ± 9,1	67,6 ± 4,0
Adrenal Insuffi- ciency	"11-OHCS" µg/100 ml	4,5	5,0	6,5	6,0
	bound F %	96,8	97,2	96,3	97,5
	"free" F %	3,2	2,8	3,5	2,5
Cushing's syndrome 2 Pat.	"11-OHCS" µg/100 ml	27,0/25,5	97,0/81,8	38,0/44,0	96,0/98,2
	bound F %	65,1/46,9	19,3/16,1	50,0/39,1	18,2/13,5
	"free" F %	35,0/53,1	80,7/83,9	50,0/60,9	82,0/86,5

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Mattingly: J. Clin. Path. 15 (1962) 374.