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Stability of Steroid Profiles (2) : Excretion Rates from Morning Urines

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The excretion rates of endogenous steroids in male and female urine were investigated. In this study six male (age: $\bar{x}=33 \pm 5$ years) and six female subjects (age: $\bar{x}=32 \pm 4$ years) participated.

Morning urine samples were collected for 30 days (men) respectively for one menstrual cycle (women).

The urines were prepared according to the screening procedure of conjugated anabolic steroids and analysed by GC/MS (1).

The following steroid glucuronides were measured: androsterone (and), etiocholanolone (etio), testosterone (t), epitestosterone (epit), 11β -OH-androsterone (OHa), 11β -OH-etiocholanolone (OHe), $3\alpha,5\alpha$ -androstandiol (a-diol) and $3\alpha,5\beta$ -androstandiol (b-diol).

The results of the excretion rates and their statistical evaluation are shown in Tables 1-4.

Conclusions:

- On principle, excretion rates of morning urine samples are not constant.
- The excretion rates of androsterone, etiocholanolone, epitestosterone and testosterone of most male volunteers shows only little variation.
- In female volunteers the excretion rates of epitestosterone and testosterone shows much more variation. The concentrations of these substances are near the detection limit and frequently other endogenous substances coelute with testosterone and epitestosterone.

References

- (1) Donike M., Geyer H., Gotzmann A., Kraft M., Mandel F., Nolteernsting E., Opfermann G., Sigmung G., Schänzer W. and Zimmermann J.: Dope Analysis
In: Official Proceedings of the International Athletic Foundation World Symposium on Doping in Sport. P.Bellotti, G.Benzi, A.Ljungquist (Hrsg.) IAAF Florence (1988) 53-87.
- (2) Mareck-Engelke U., Geyer H. and Donike M.: Stability of steroid profiles
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Table 1: Stability of steroid profiles (male urines).

Coefficient of variation (%) of excretion rates

(V1-V6 = volunteer 1-6).

	V1	V2	V3	V4	V5	V6
and	19	19	15	13	43	12
etio	15	23	15	17	42	15
epit	19	19	13	16	41	15
t	22	20	17	21	43	16
a-diol	25	40	16	27	45	16
b-diol	21	46	16	27	47	15
OHa	40	35	15	21	43	25
OHe	31	46	21	25	69	33

Table 2: Stability of steroid profiles (male urines).

Statistics of some selected excretion rates

(min = minimum value; max = maximum value;

st.de. = standard deviation; c.v. = coefficient of variation (%).

		V1	V2	V3	V4	V5	V6
and (µg/h)	min	56	41	46	114	74	86
	max	134	118	111	195	487	138
	mean	86	87	84	144	233	111
	st.dev.	17	17	12	19	101	14
	c.v. (%)	19	19	15	13	43	12
etio (µg/h)	min	38	36	49	83	47	50
	max	76	105	117	165	342	79
	mean	56	74	82	104	163	59
	st.dev.	8.5	17	12	18	68	8.7
	c.v. (%)	15	23	15	17	42	15
epit (µg/h)	min	0.9	0.8	1.1	1.6	0.5	0.5
	max	2.0	2.5	1.9	3.2	3.6	1.0
	mean	1.5	1.8	1.5	2.0	1.9	0.7
	st.dev.	2.28	0.33	0.20	0.33	0.79	0.11
	c.v. (%)	19	19	13	16	41	15
t (µg/h)	min	1.7	0.12	0.9	1.3	0.6	2.6
	max	3.8	0.35	2.1	3.3	3.4	5.4
	mean	2.6	0.23	1.4	1.8	2.0	3.9
	st.dev.	0.59	0.05	0.23	0.38	0.85	0.64
	c.v. (%)	22	20	17	21	43	16

Table 3: Stability of steroid profiles(female urines).
Coefficient of variation (%) of excretion rates
(V1-V6 = volunteer 1-6).

	V1	V2	V3	V4	V5	V6
and	15	21	21	14	23	28
etio	18	23	21	16	24	39
epit	30	47	35	32	28	38
t	34	25	59	44	32	40
a-diol	24	18	65	14	28	38
b-diol	43	26	47	22	28	67
OHa	29	48	36	29	28	34
OHe	44	54	25	37	44	55

Table 4: Stability of steroid profiles (female urines).

Statistics of some selected excretion rates

(min = minimum value; max = maximum value; st.de. = standard deviation;

c.v. = coefficient of variation (%).

		V1	V2	V3	V4	V5	V6
and (µg/h)	min	43	81	22	54	22	48
	max	73	161	57	96	66	151
	mean	56	112	39	71	38	74
	st.dev.	8.2	24	8.1	10.1	8.57	21
	c.v. (%)	15	21	21	14	23	28
etio (µg/h)	min	35	48	30	72	39	67
	max	73	108	72	129	113	299
	mean	49	67	52	95	66	114
	st.dev.	9.1	15	11.1	15.2	16	44
	c.v. (%)	18	23	21	16	24	39
epit (µg/h)	min	0.03	0.2	0.03	0.07	0.08	0.2
	max	0.1	1.07	0.13	0.26	0.3	0.97
	mean	0.06	0.56	0.06	0.15	0.19	0.57
	st.dev.	0.02	0.26	0.02	0.05	0.05	0.22
	c.v. (%)	30	47	35	32	28	38
t (µg/h)	min	0.13	0.23	0.06	0.02	0.19	0.36
	max	0.42	0.59	0.43	0.14	0.64	1.69
	mean	0.2	0.43	0.14	0.08	0.32	0.85
	st.dev.	0.07	0.11	0.08	0.04	0.1	0.34
	c.v. (%)	34	25	59	44	32	40

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