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Abstracts prepared for the meeting of the Minnesota Academy of Sciences, held on April 27-28, 1984 at the College St. Thomas, St. Paul, Minnesota, USA (chronobiology session).

Arbogast H., Sothern R., Halberg F.: Institut für Soziale Pädiatrie und Jugendmedizin, München, West Germany; Chronobiology Laboratories, University of Minnesota, Minneapolis, Minnesota, USA.

Macroscopic differentiation by plasma LH of Stein-Leventhal syndrome (S) from clinical health (H) quantified by cosinor.

The use of chronobiologic methods such as the single cosinor (Halberg et al.: The cellular aspects of biorhythms. Symposium on biorhythms, pp. 20-48, 1967) complements (macroscopic) impressions from the inspection of time plots by objective and quantitative individualized point and interval estimates of rhythm characteristics and thereby facilitates clinical diagnosis. Zumoff et al. (New Engl. J. Med. *309*, 1206-9, 1983) determined the plasma concentration of luteinizing hormone (LH) over a 24-h span in 5 teenage girls with the polycystic-ovary-syndrome (S) to explore indices of possible changes in central-nervous-system-endocrine coordination. In 4 of the 5 patients macroscopy showed strikingly abnormal plasma LH profiles: whereas clinically healthy pubertal girls had major episodes of LH secretion during their nocturnal sleep span, the patient's episodes were widely desynchronized from their sleep span. Reportedly LH, but not cortisol, patterns were altered. The data taken off published graphs are here quantified by single cosinor with the fit of a 24-h period (≡360°) as follows:

N	subject kind	sex	age years	PR	p	mesor M	SE mIU/ml	amplitude A	SE	acrophase (ø) ø*	SE	h/min
1	S	f	13	53	0.001	38.0	1.4	17.3	2.0	−184°	7	12^{16}
2	S	f	15	44	0.001	62.9	1.4	14.5	2.0	−205°	8	13^{41}
3	S	f	16	6	0.121	50.1	1.2	3.6	1.7	−229°	27	15^{17}
4	S	f	16	18	0.001	26.0	0.4	2.2	0.6	−266°	14	17^{42}
5	S	f	16	26	0.001	59.5	1.3	9.2	1.9	−198°	12	13^{13}
6	H	f	13	53	0.001	5.4	0.4	4.4	0.5	−71°	7	04^{43}
7	H	m	15	78	0.001	6.4	0.2	3.7	0.2	−63°	4	04^{13}
8	H	m	15	21	0.001	4.8	0.2	1.0	0.2	−102°	14	06^{46}

* ø in degrees - with 360° ≡ 24 h; 0° = 00^{00}

With the above analyzed 20-min data available, a statistically significant circadian rhythm is demonstrable in 7 of 8 subjects below the 0.001 level. Parameter tests reveal a statistically significant difference between H and S in M, ø and (A-ø) pair, which persists when series consisting of only 4- or even 6-hourly data are analyzed. Prior macroscopic observations of the original authors are thus validated microscopically by computer methods that may be particularly valuable in cases that are not as obvious as those here analyzed.