always observed atrial action potentials at all outer margins of the sinoatrial node[2,3]. The little-excitable transitional cells are predominant at the septal side of the typical nodal cells.

The table gives information about the values of all 5 variables after the distribution of the 30 cells over the 4 classes by stepwise discriminant analyis. The maximal diastolic potentials in the 4 classes are also given. These do not differ significantly. From the figure and the table we conclude that there is good reason to distinguish a 4th class of cells within the rabbit sinoatrial node. Little-excitable transitional cells are intermediate between atrial cells and the other 2 cell types with respect to all 3 tested morphological variables. However, their rate of diastolic depolarization is as low as that of atrial cells. Their rate of systolic depolarization is as low as that of typical nodal cells. Their low excitability causes the zone of block within the rabbit sinoatrial node. It explains the fact that the ultrastructure of the rabbit sinoatrial node is symmetrical, while the activiation pattern is asymmetrical.

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Photoperiodicity in the male rosefinch[1]

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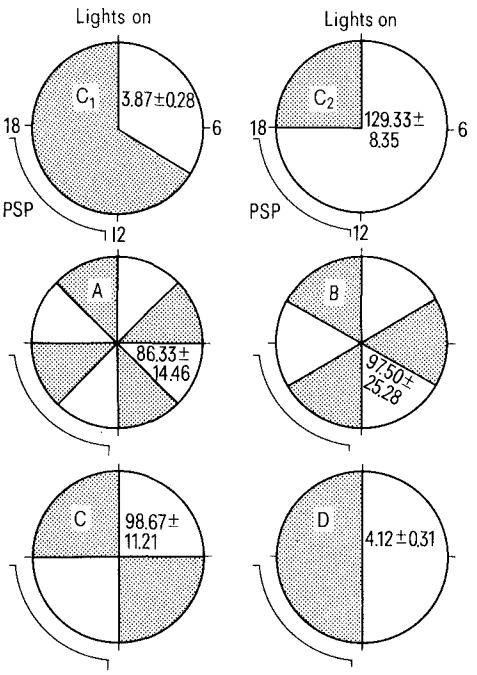
Summary. In male rosefinches *(Carpodacus erythrinus)* 12 h non-stimulatory photoperiods (12L:12D) were as effective in stimulating testicular recrudescence, as were long photoperiods (18L:6D) when presented as several intermittent symmetrical photoperiods. The results are discussed with regard to the hypothesis that photoperiodic effects in birds are mediated by circadian rhythms.

As yet most of the experimental evidence for photoperiodic gonadal responses in birds pertains to the temperate seasonal breeders[3,4]. However, recently we could demonstrate that the reproductive rhythms in a few migratory birds, overwintering on the Indian subcontinent (tropics/subtropics), are controlled by circadian rhythms, which are manipulated by light/dark cycles[5–10]. Here, we will report the results from the experiments performed on common Indian rosefinches *(Carpodacus erythrinus)* to determine the effect of symmetrical, intermittent light on testicular growth. This species uses longer photoperiods to induce its reproductive activities[11,12], and gonadotropic activity depends upon circadian period of light-sensitivity as shown by resonance and night-interruption experiments[7,8]. The present experiments were aimed to investigate: a) whether multiple light flashes given during the so-called photosensitive (=photoinducible) phase (PSP; 12 h following lights 'on' or 'dawn') were more effective than a single light flash, and b) whether photostimulated testis growth depends upon the duration of light within the PSP.

Materials and methods. Groups (n=4 each) of adult male rosefinches (previously maintained on 8 h light and 16 h darkness, 8L:16D) were exposed to different programmed photoperiods (3L:3D, 4L:4D, 6L:6D and 12L:12D) adding up to a total of 12 h light per day, at an intensity of about 300 lux at perch level, but differing in the number of light/dark cycles by which the 12 h light was given; besides, a group was exposed to 18L:6D as long-day controls. Laparotomy at this time showed that they had regressed testes (combined testicular weight, CTW=about 4 mg); simultaneously a group (n=4) was sacrificed and the testes were fixed in fixative; this served as initial control. After a 30-day exposure to the experimental conditions, all the finches were sacrificed and testes were fixed in fixative. Testes were fixed in fixative (a solution of 95% ethanol:glacial acetic acid:40% formalin:water; 50:10:10:30) for 2 days, transferred into 70% ethanol for an additional 2 days, and then weighed to nearest 1 mg on an ADCO



Gonadal responses of male rosefinches after 30 days (except C_1) in the photoperiodic cycles indicated. Each circle is a separate group and once around is a 24-h period. The stippled area represents scotophase. PSP represents photosensitive phase within a 24-h period, demonstrated by night-interruption experiments[8]. Group C_1 is the initial controls from 8L:16D; C_2, 18L:6D; A, 3L:3D; B, 4L:4D; C, 6L:6D; D, 12L:12D. All experiments started initially with 4 individuals; 3 birds, 1 each from C_2, A, and C, died during the experimental period and the data were not included in our statistical analysis. Within each group is indicated the mean testes weight ±SE. Testes weight in any of the stimulated groups were higher ($p < 0.001$) than initial or 12L:12D; there was, however, no significant difference among the stimulated groups.

electric pan balance. Food and water were given ad libitum. The first experimental photophase was always in the phase with the pretreatment, and commenced at 06.00 h. Data were analyzed by Student's t-test; each group was compared with every other group.

Results and discussion. The data summarized in the figure demonstrate that unlike the situation in Japanese quails[13,14] increase in number of light cycles or presence of more light during the PSP is not associated with synthesis and release of additional GTH (gonadotropic hormone) in the rosefinches. Since rosefinches have PSP of about 5 h (12/13 to 17/18 h after dawn[8]), obviously in all the experiments, except 12L:12D, only 1 of the light pulses occur during the PSP (fig.). 12L:12D has thus no coincidence of light with PSP and hence no testicular response[12]. Further, the larger testes in the 18L:6D birds does not appear to be due to presence of more light during the PSP, since the 6L:6D group had an equal amount of illumination during the PSP but did not have bigger gonads than other stimulated groups. Moreover, the average CTW for birds in 18L:6D is not significantly greater than for birds in 3L:3D, 4L:4D or 6L:6D.

The results are comparable to our earlier studies on this species[7,8] and others[3], and are consistent with the hypothesis[15] that the daily photoperiod has a dual role: 1. as entrainer of the circadian rhythmicity in 'photosensitivity', and 2. as an inducer, if it is long enough to extend into the PSP of the entrained circadian rhythmicity in 'photosensitivity'. Thus, on the basis of our this and earlier studies[7,8] we believe that the photoperiodic gonadal responses in *C. erythrinus* are regulated by circadian rhythms, and that the mechanism involved during time-measurement is easily explainable within the framework of the 'external-coincidence' model.

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Copurification of prostaglandin $F_{2\alpha}$ receptors with rat uterine plasma membranes[1]

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Summary. Myometrial homogenates of estrogen-treated nonpregnant rats were fractionated by differential and discontinuous sucrose gradient centrifugation. Binding of $PGF_{2\alpha}$ was maximal in membrane fraction which showed the highest specific activity of 5'-nucleotidase, a marker for plasma membrane.

Although the uterotonic action of $PGF_{2\alpha}$ has been extensively documented and its functional role in parturition often implied[3,4], the intimate mechanism of action of PG-induced uterine contractions is still poorly understood. However, specific uptake of $PGF_{2\alpha}$ by uterine preparations suggests that PGs trigger contractile activity by first binding with high affinity to discrete sites on myometrial cells. Such interaction may alter certain cell functions (e.g. calcium transport) leading to muscular contractions. It is not clear however, whether PGs bind to the exterior of cell membranes in a fashion that is analogous to peptide hormones, or act in the cell interior where they interact with cellular components (e.g. sarcoplasmic reticulum). In this study we attempted to elucidate this question by correlating the increase in the specific activity of a typical marker enzyme of plasma membrane with that of the binding of $PGF_{2\alpha}$ to the same rat uterine preparations.

Materials and methods. Virgin Sprague Dawly rats received daily doses of diethylstilbestrol (1 mg i.p.) for 3 consecutive days. 24 h after the last injection the rats (12/experiment) were killed and the uterine horns were removed and the pooled myometrial tissues were first minced with scissors and then homogenized in ice-cold buffer (0.25 M sucrose, 10 mM Tris-HCl, pH 7,5, 1 mM mercaptoethanol and 1 mM Ca Cl_2), using a Polytron homogenizer at rheostat setting 5 for 3×15 sec. The homogenate was filtered through 2 layers of surgical gauze and the filtrate centrifuged at $600\times g$ for 15 min. The pellet was resuspended in buffer and stored at -20 °C (fraction F_1). The supernatant was centrifuged at $2000\times g$ for 20 min. The pellet was

Distribution of marker enzymes in rat myometrial fractions obtained by differential centrifugation

	$Mg^{2+}(Na^+ + K^+)$-ATPase	Mg^{2+}-ATPase	5'-Nucleotidase
Homogenate	20.5 ± 2.7	29.0 ± 7.2	10.3 ± 1.3
F_1 fraction	30.4 ± 3.9	32.5 ± 7.0	8.2 ± 2.6
F_2 fraction	45.2 ± 12.2	32.0 ± 4.9	9.2 ± 1.6
F_3 fraction	52.6 ± 9.2	53.3 ± 14.1	17.2 ± 0.2
F_4 fraction	102.8 ± 21.4	88.3 ± 27.8	26.5 ± 2.4

Enzyme activity is expressed as μmoles P/mg protein/h. Mean values were calculated from data obtained with 3 different preparations ± SEM.