suggest that deprivation of form vision alone is not sufficient to explain the induction of myopia in man.

On the assumption that it was eye closure per se (rather than visual interference) which was the triggering factor in this type of myopia, we then compared the relative duration of sleep in siblings and cohabitants with their relative refractive errors; 133 such pairs of people were evaluated. In 85 out of 133 pairs the person who slept the more (an easy observation in people living together) exhibited the greater degree of myopia ($p < 0.005$). This sample was not taken from a wide section of the population: We selected cases from the families of our students and associates. To ensure that the result was not unduly biased by its narrow population base, we interviewed myopes with non-academic backgrounds, and obtained a further 57 pairs. In this group the more myopic slept the more in 39 cases ($p < 0.01$), confirming our first observations.

Further evidence of the effect of partial or total eyelid closure is provided by a) cases of infantile hemangiomas[9] and b) cases of external ophthalmoplegia[10]. In both conditions it was found that the affected eye was associated with marked myopia relative to the normal eye.

Taken in conjunction with our own observations this seems to indicate that there is a very basic relationship between ocular coverage and myopia in humans, as well as in other species[2-5].

We do not suggest that the enormously complex aetiology of myopia can be reduced to an equation involving only the palpebral aperture. It is noteworthy, however, that in the normal reading posture, the aperture is reduced; we also note that many races prone to myopia, (e.g. Chinese[11]) have a narrow palpebral aperture.

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Photoperiodic regulation of winter diapause in the grass spider

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Summary. Winter diapause of the grass spider was experimentally proved to be photoperiodically regulated. Critical day-length for the termination of diapause; being shortened during winter, was suggested to ensure successfull hibernation of this species.

Diapause as an important means of seasonal adaptation has been extensively explored only in particular groups of arthropods, insects and mites[2]. Although a few reports have described the presence of diapause in Araneae[3-7], the significance of photoperiod in regulating the diapause of spiders has not generally been recognized. The author elucidated the occurrence of a winter diapause in the grass spider, *Agelena limbata* Thorell (Agelenidae), and demonstrated experimentally the important role of photoperiod in the maintenance of this diapause.

The grass spider is a most common species of univoltine life cycle in Japan[8]. The overwintered 2nd-instar spiderlings emerge from the egg-sacks in late March to early April. They construct platform webs on weeds or shrubs and develop into adults in late July to early August presumably after 4–5 moults. The adults copulate in mid to late August and each female lays about 70 eggs in a egg-sack in late September to early October. The eggs hatch 1–2 weeks later, and the spiderlings moult into the 2nd instar in about 15 days. The 2nd-instar spiderlings then enter diapause and

Photoperiodic responses of the grass spider during the overwintering period

Time of transfer			Photoperiod (light: dark) h						
Day after the 1st moult	Date		10:14	12:12	13:11	13.5:10.5	14:10	14.5:9.5	16:8
0	Nov. 5	%*	7	31	5	98	98	100	95
	(12)**	day*	165	140	145	26	39	29	28
40	Dec. 15	%	0	18	82	100	95	99	88
	(12)	day	0	125	48	27	28	28	25
91	Feb. 4	%	97	34	100	100	99	98	-
	(8)	day	50	55	19	18	18	16	-
131	Mar. 16	%	-	-	100	92	-	-	54
	(3)	day	-	-	13	16	-	-	13

* '%' indicates the percentage of emergence of 2nd instar spiderlings, and 'day' indicates average duration in days from the transfer of egg-sacks to the emergence. ** Values in parentheses are the number of egg-sacks used.

remain in the egg-sack until next spring. 1st- and 2nd-instar spiderlings do not take any food, and no cannibalism occurs.

To discover a possible effect of photoperiod on the winter diapause of this spider, egg-sacks collected in the field in late September and kept in the outdoor conditions were periodically transferred to the laboratory conditions (20 °C, 70% rel. humidity) under various photoperiods (20 W white fluorescent lamp) as given in the table. 3 egg-sacks were kept under the outdoor conditions throughout the entire period as a control.

The results are summarized in the table. More than 95% of the spiderlings emerged in 26–39 days (average: 31 days) from egg-sacks which were kept in the long days over 13.5 h light:10.5 h dark since November 5, i.e., the day of the 1st moult. In the short days less than 13 h light:11 h dark, however, the percentage emergence was 5–31%, and 140–165 days were needed for the emergence. The critical day-length seemed to lie between 13 and 13.5 h in this season. Interestingly, it was shortened and occurred between 12 and 13 h when the egg-sack were transferred on December 15, 40 days after the 1st moult. From the egg-sacks transferred on February 4, over 90% emerged in 50 days even in 10 h light:14 h dark. Egg-sacks kept under the outdoor conditions throughout the entire period showed 99% emergence 160 days after the 1st moult.

The growth retardation at the 2nd instar thus seems to be diapause or a physiological state similar to that generally observed in overwintering insects. The main factor controlling this diapause seems to be a combined effect of temperature and photoperiod. A photoperiodic effect was clearly recognized before winter, but the critical day-length for the termination of diapause was changed during the overwintering period. The day-length in the early overwintering period (November) in central Japan, where the specimens were collected, is shorter than the critical day-length and shortened further until the winter solstice. Therefore, the diapause in autumn and early winter should be maintained by the short days. In mid winter, the emergence of the spiderlings seems to be inhibited by the coldness per se, while the suppressing effect of short days gradually decreases. This is effective to avoid the delaying effect of the spring short days.

The most interesting point in the present results is that the diapause in the grass spider is maintained by the short-day effect in autumn. Tauber and Tauber[9] cited similar examples from insects, among which the diapause character of the green lacewing, *Chrysopa harrisi* seems to be analogous to the present case. The critical day-length in the lacewing is gradually shortened during winter, and natural day-length in the spring is no longer significant as a releaser of diapause termination, being far longer than the critical value. The situation is similar in the spider, and the major function of its photoperiodic response would be to suppress the emergence of the spiderlings in autumn when the temperature is still above the lower limit for their active movement, and thus to ensure successful hibernation.

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Features of intracellular calcium distribution in the adipose tissue of spontaneously hypertensive rats (SHR)

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Summary. The in vitro study of the kinetics of ^{45}Ca efflux from adipose tissue of rats reveales 3 pools of exchangeable calcium. Calcium content in the intracellular pools of adipose tissue of spontaneously hypertensive rats is increased as compared to that in normotensive controls.

Abnormality in calcium handling by the cell membranes has been found in vascular smooth muscle[1–4], in cardiomyocytes[1,2] and in erythrocytes[5] of spontaneously hypertensive rats (SHR); this gives certain ground for considering these findings as fragments of a more wide-spread deficiency of the membrane maintenance of intracellular free calcium concentration. This membrane defect in SHR seems to be related, at least, to some types of tissues of mesenchymal origin; its possible presence in the cells of adipose tissue may explain the differences in the sensitivity of adipocytes to the in vitro action of insulin[6], ACTH[7] and adrenalin[8] recently found in SHR.

The present investigation was performed to study the features of intracellular calcium distribution in the adipocytes of SHR by the efflux of ^{45}Ca from the adipose tissue in vitro. Since the differences in hormonal sensitivity in a number of cases had been found earlier in a series of adrenalectomized rats[6–8], a part of the present experiments were carried out on previously adrenalectomized animals.

Material and methods. Spontaneously hypertensive 10-week-old rats (SHR, Kyoto Wistar) with blood pressures of 180–210 mm Hg were used. The normotensive rats (control group) consisted of inbred male Wistar rats (NWR) of the same weight and age (BP 80–100 mm Hg). All of the animals were kept under the same conditions on standard rat diet (briquettes) and tap water from the moment of weaning. A part of the study was carried out on rats adrenalectomized 7 days prior to the experiment. Following adrenalectomy the rats drank a 1% NaCl solution. The systolic blood pressure (BP) was determined without anaesthesia by means of tail plethysmography. Before decapitation the rats were starved 24 h with free access to water (or a 1% NaCl solution). After decapitation pieces (200 mg) of the epididymal fat pads were cut off, weighed and washed in saline solution, preincubated for 2.5 h at 37 °C in Krebs-Ringer phosphate buffer with the addition of $^{45}CaCl_2$ (0.2 μCi/ml), and washed 3 times with a saline solution for 1 min. In the following 170 min the pieces were passed through 29 scintillation vials each containing 1 ml of the buffer (t° = 25 °C).