were able to mobilize leukocytes more effectively than normal animals (figure 1). Phagocytosis of platelet aggregates by these cells is paralleled by H_2O_2 formation and release[17,18]. Therefore effects of this substance on platelet aggregation induced by ADP, collagen, or endotoxin were determined (figure 2). H_2O_2, as indicated by others[19], reduced aggregation induced by ADP or collagen. However, H_2O_2 was ineffective against endotoxin-induced aggregation.

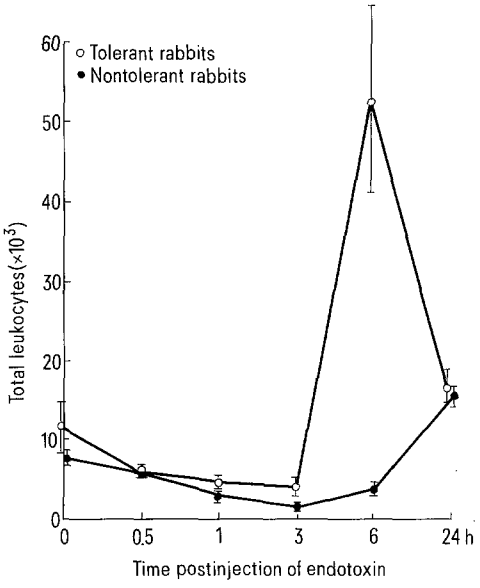

Fig. 1. Alterations in total circulating leukocyte numbers in tolerant and nontolerant rabbits challenged i.v. with 50 µg of *S. typhosa* endotoxin. 3–5 animals were used to make each determination.

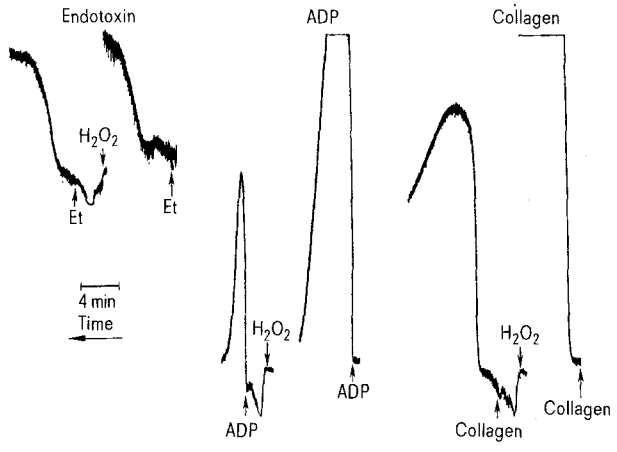

Fig. 2. Effect of treatment of normal rabbit platelets with H_2O_2 on aggregation induced by endotoxin, ADP, or collagen.

In summary, we found that one major leukocytic regulator of aggregation, H_2O_2, does not alter endotoxin-induced platelet aggregation. Elaboration of H_2O_2 during phagocytosis may limit additional aggregation after endotoxin is trapped, thereby reducing the phagocytic load of the leukocytes and the subsequent release of their mediators, which can contribute to the lethal consequences associated with the toxin[20–22]. Altered platelet aggregation characteristics and rapid leukocyte mobilization associated with tolerance could enhance clearance of platelet-associated endotoxin from the microcirculation and its transport to the RE system for further processing.

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Effect of temperature and light on the production of androgens in the male *Rana esculenta*[1]

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Summary. The present data show that experimentally-controlled environmental variables (light and temperature) can alter circulating androgen levels in the male green frog, *Rana esculenta*, treated in different phases of the testicular cycle.

Rana esculenta has a potentially continuous type of spermatogenesis. Histological studies suggest that high temperature stimulates pituitary gonadotropin secretion and spermatogenesis, whereas the reverse occurs at very low temperatures[2]. These results also suggest that various aspects of the testicular cycle show a differential sensitivity to environmental cues. The plasma levels of testosterone are high in late winter and very low in summer[3]. Thus, although the

Effects of daylength (hours of light per day LD) and temperature (°C) on plasma androgen concentration (expressed as ng androgen, testosterone and dihydrotestosterone, per ml of plasma) of male *Rana esculenta*

Experimental groups	Control	24 °C ± 1 °C LD 0:24	LD 24:0	LD 12:12	4 °C ± 1 °C LD 12:12
A January 1977*	6.56 ± 3.31	8.51 ± 1.88	18.66 ± 3.23**	-	4.34 ± 0.32
B June 1977	2.11 ± 0.29	2.41 ± 0.87	2.72 ± 0.93	1.69 ± 0.27	2.14 ± 0.64
C July 1977	1.61 ± 0.45	1.29 ± 0.43	1.21 ± 0.35	1.36 ± 0.46	1.21 ± 0.74
D October 1977	1.36 ± 0.42	2.05 ± 0.94	-	2.66 ± 1.10	4.50 ± 0.89**
E January 1978	11.60 ± 2.79	-	-	19.37 ± 1.60	6.98 ± 3.34

* Data taken from Rastogi et al.[2]; frogs were kept at 28 °C, instead of 24 °C. ** Significance of difference vs control $p < 0.01$.

importance of light and temperature in the regulation of the annual testicular cycle in this species is well established, little is known about their effects on androgen production[2,4,5]. In this study the effects of light and temperature on the production of androgens were examined in *Rana esculenta* at different stages of testicular activity.

Materials and methods. Sexually mature specimens of *Rana esculenta* were collected in the months of January, June, July and October 1977 and January 1978. Photothermal treatments (table) were continued for a total of 7 days. Each group consisted of 8–10 frogs plus controls. Each frog was anaesthesized with MS 222 and the blood was collected in heparinized micro-tubes directly from the conus arteriosus. For each determination 200 µl of plasma was used. ^{3}H-testosterone, sp. act. 100 Ci/mM was used. Testosterone-3-oxime BSA was employed as antiserum. It reacts appreciably with dihydrotestosterone (17β-hydroxy-5α-androstan-3-one) and measurements are therefore referred to as total androgens. Results were analyzed for significance using Student's t-test.

Results and discussion. The table summarizes the changes in average plasma androgen levels at different temperatures during different periods of the year. In winter (experiments A and E) plasma androgens increased significantly at high temperature only in frogs provided with a light source. In animals kept at 24 °C but in total darkness, and those kept at 4 °C and 12:12 h light-dark cycle, the plasma androgen levels remained unaltered. This confirms our previous observations concerning the importance of light[2]. In summer frogs (experiments B and C), on the other hand, none of the combinations of temperature and light used in this study had any effect. In October (experiment D), however, low temperature stimulated the plasma androgens, while high temperature had no significant effect.

The discussion would be quite simple if we had information on the circulating levels of gonadotropins during the year. Since this is totally missing from the literature the task of discussing results like the present one is quite arduous. The high temperature-induced increase of plasma androgens in winter frogs could be explained on the basis of our knowledge that high temperatures stimulate pituitary gonadotropin secretion[2,5,6]. October frogs show an increase in plasma androgens at low temperature, and observations in nature confirm that during this period of the year the falling environmental temperature favours a rise in plasma androgens. In summer frogs, the low androgen levels remain unaltered under any experimentally-produced environmental condition. Thus, although this is fraught with risk, we venture to speculate that there probably exists an endogenous rhythm for the sensitivity of testicular steroidogenic sites to the pituitary gonadotropins, which in turn are under the control of environmental variables. In addition, the present data demonstrate that the effects of environmental stimuli on the reproductive biology of *Rana esculenta* are considerably more complex than suggested earlier[2,5,6]. In fact it is shown that different parameters, like pituitary gonadotropic activity, the response of the testis to pituitary gonadotropins, and the response of peripheral androgen target organs, are not equally temperature-sensitive. Thus follow-up research is certainly needed.

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Changes in adenylate cyclase and 5′-nucleotidase activities in liver membranes from alloxan diabetic rats

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Summary. Liver membrane adenylate cyclase activity was significantly higher and 5′-nucleotidase activity significantly lower in alloxan diabetic rats compared with normal rats.

The enzyme 5′-nucleotidase (EC3.1.3.31) is located in the external part of the plasma membrane. Adenylate cyclase (EC4.6.1.1.) is situated in the interior part of the plasma membrane. The hepatic level of adenosine 3′5′-monophosphate (cyclic AMP, cAMP), the product of adenylate cyclase, is increased in alloxan diabetic rats[1]. Adenosine, the product of 5′-nucleotidase, is rapidly translocated from the outside into cells where it is metabolized[2]. This causes steady state levels to be very low. In previous studies adenosine has been linked with insulin action[3] and has also been found to have a strong inhibitory influence on adenylate cyclase activity in liver membranes[4]. Recently, recipro-