



# HOKKAIDO UNIVERSITY

Title	THE ROLE OF THE RABBIT EAR IN THERMOREGULATION AND IN COLD ACCLIMATION
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## INFORMATION

Hokkaido University granted the degree of Doctor of Veterinary Medicine to the following 2 researchers on 30 September, 1973 under a new regulation (1962) authorizing the granting of the Graduate School of Veterinary Medicine.

The titles of their theses and other information are as follows:

### THE ROLE OF THE RABBIT EAR IN THERMOREGULATION AND IN COLD ACCLIMATION

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1) The role of the rabbit ear in thermoregulation and in cold acclimation has been studied by varying the temperature of a climatic chamber in a range from  $-10^{\circ}$  to  $+35^{\circ}\text{C}$ .

2) The skin temperature in non-anaesthetized rabbit ear showed a unique response to changes in environmental temperatures. The ear temperature approached to the rectal temperature at high environmental temperature ranges, whereas, at a low environmental temperature, the ear temperature approached to the environmental temperature. At the intermediate range of the environmental temperature, the ear temperature responded sharply to a slight change of environmental temperature. Thus, a unique S-shaped curve was obtained between the ear temperature on the ordinate and the environmental temperature on the abscissa, whereas a linear line was drawn between the environmental temperature and the temperature of the other parts of the body surface.

3) The mean environmental temperature corresponding to the inflection point on the S-shaped curve varied with the seasons; it was about  $18^{\circ}\text{C}$  estimated in summer (July to Nov.) and about  $13^{\circ}\text{C}$  in winter (Feb. to Apr.). The mean temperature of the inflection point shifted significantly ( $P < 0.01$ ) from  $13^{\circ}\text{C}$  to  $8^{\circ}\text{C}$  after cold acclimation of a group held for 7 weeks at  $-10^{\circ}\text{C}$ . The cold acclimated group compared to the control group, increased 30% in food consumption, 35% in water intake and 10% in body weight, and also showed the enlargement of interscapular fat, adrenals, heart and kidneys.

4) The S-shaped relation disappeared either after injection of local anaesthetics into the root of the ear or after denervation of the following vasomotor nerves: the superior cervical ganglion, the ganglion stellatum and the II and

III cervical nerves. However, this relation was not affected after bilateral adrenalectomy.

5) It is concluded that the ear of the rabbit may play an important role as a radiator in the thermoregulatory system. The shift of the inflection point gives a quantitative index of the acclimated state of the rabbit at a particular temperature.

**STUDIES ON THE BACTERIAL FLORA OF MICE  
AN ECOLOGICAL APPROACH  
TO LABORATORY ANIMAL SCIENCE**

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Original reports of this thesis appeared in *Experimental Animals*, Vol. 15, 104~112 (1966), Vol. 16, 20~25 (1967), Vol. 17, 17~21 and 142~149 (1968), Vol. 18, 127~131 (1969) and Vol. 19, 141~148 (1970) and in *Japanese Journal of Experimental Medicine*, Vol. 42, 53~65 (1972) and Vol. 43, 289~296 (1973).

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