

BIRDS : THE INSIDE STORY

**David A. Gray
School of Physiology
Wits University**

Comparative Physiology

- knowledge about animal physiology
- phylogeny (natural selection)
- understanding higher animals function

Comparative Physiology

- *“By the method of comparative physiology or of experimental biology, by the choice of a suitable organ, tissue or process, in some animal far removed in evolution we may often throw light upon some function or process in the higher animals or man”*
- *A V Hill (1910), Nobel prize winner, Physiology, 1922*

Comparative Physiology

➤ models of disease

Comparative Physiology

- hibernating animals
- migrating birds
- nectarivorous birds

PHYSIOLOGICAL FIELDS

- Osmoregulation (Salt & Fluid Balance)
- Thermal Biology (Fever)

Both are regulated by the same part of the brain (hypothalamus)

OSMOREGULATION

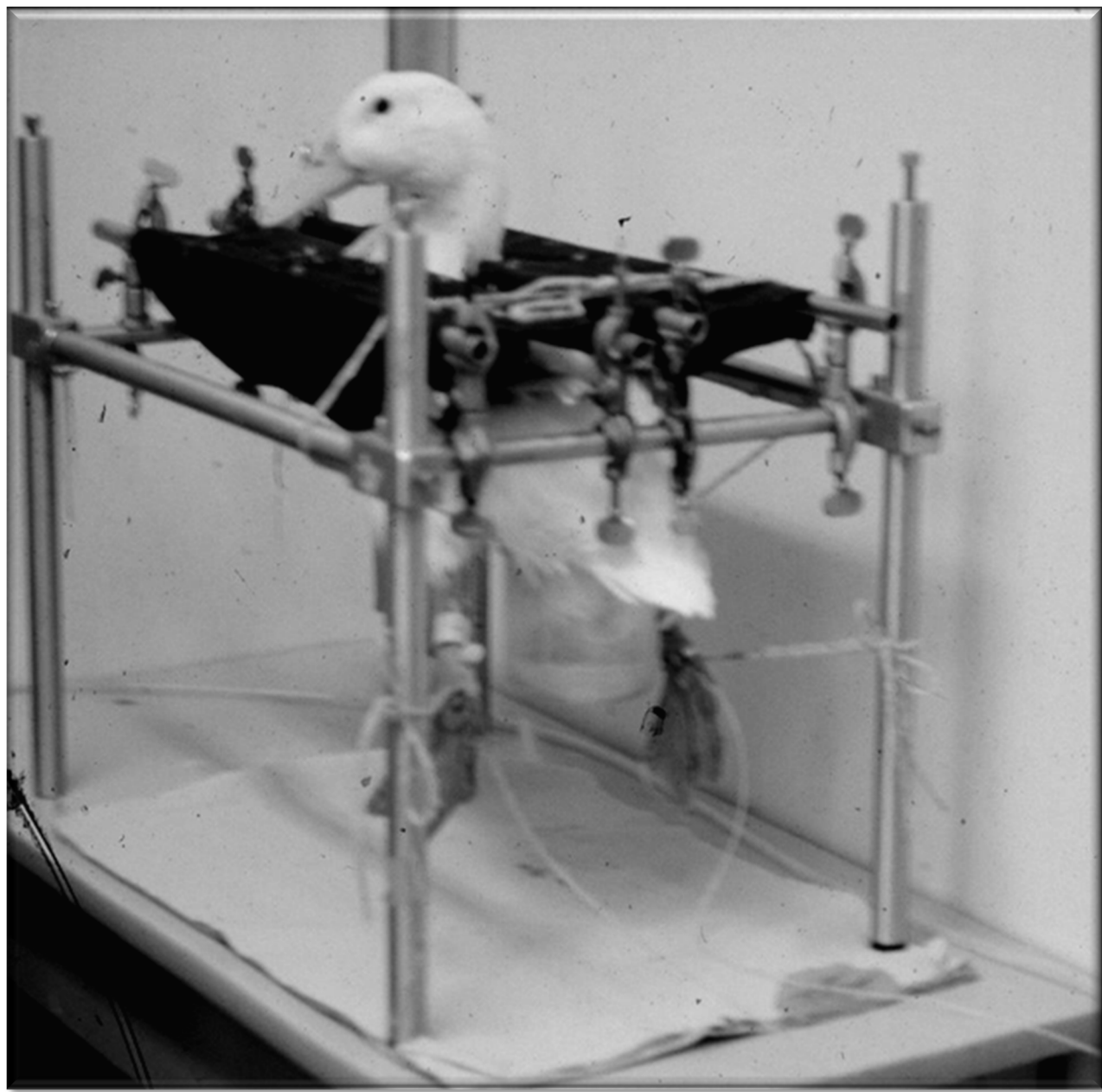
- what structures are involved?
 - kidneys
 - salt glands
- the endocrinology of salt & fluid balance
 - which hormones are involved?
 - what regulates the hormones?
 - what actions do the hormones have?

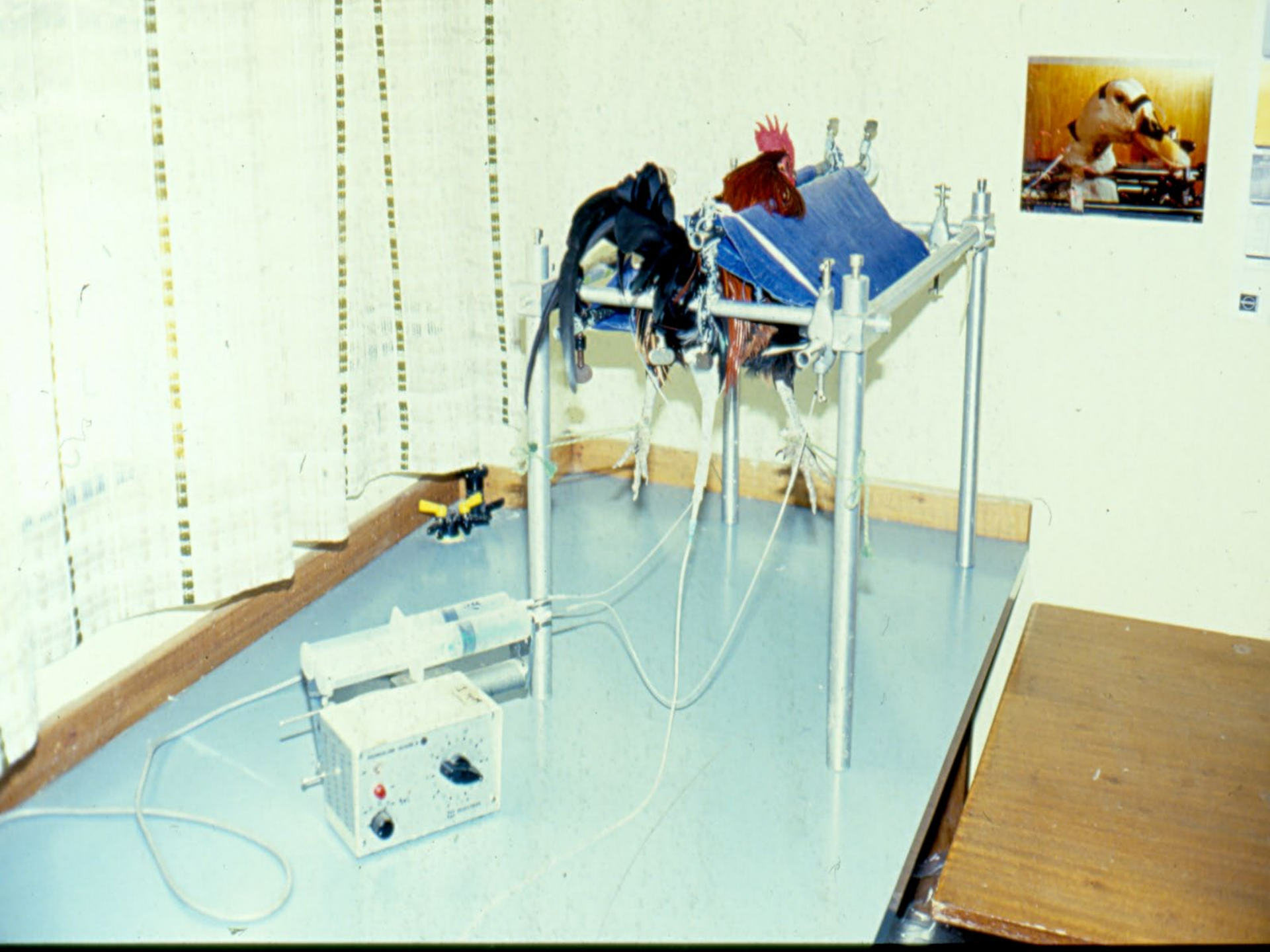
FEVER

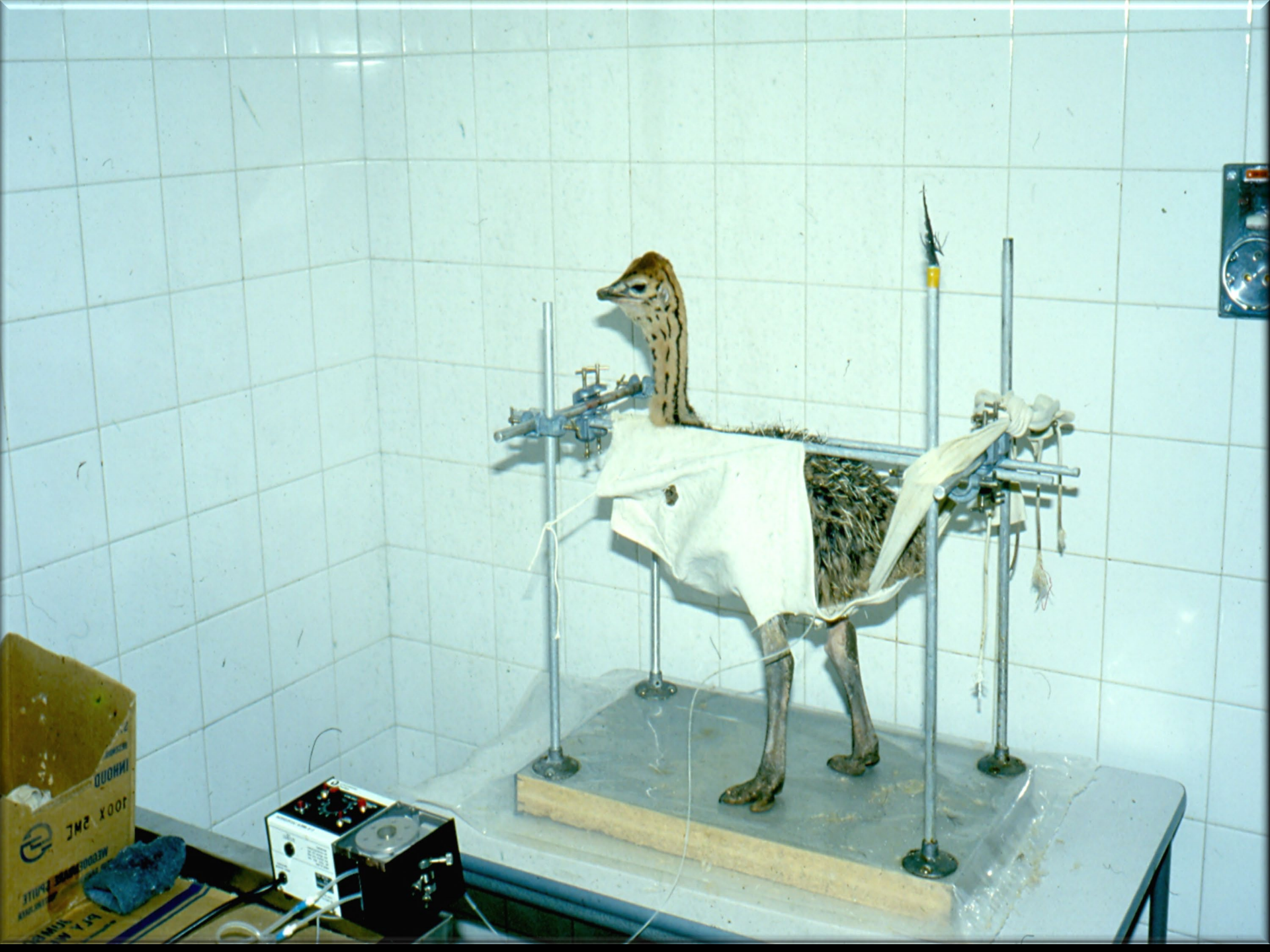
- what factors cause fever in birds?
- what are the physiological mechanisms?

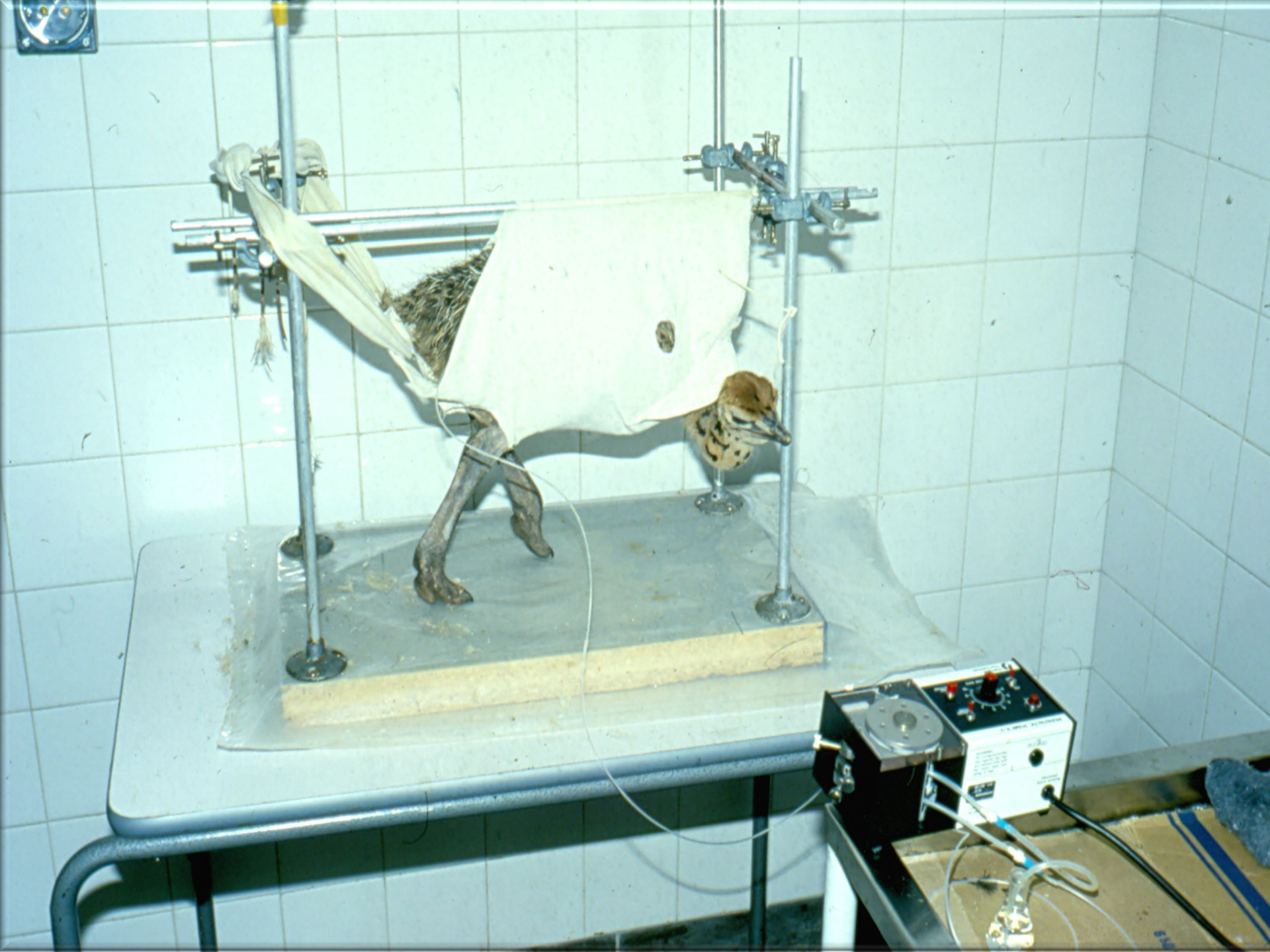




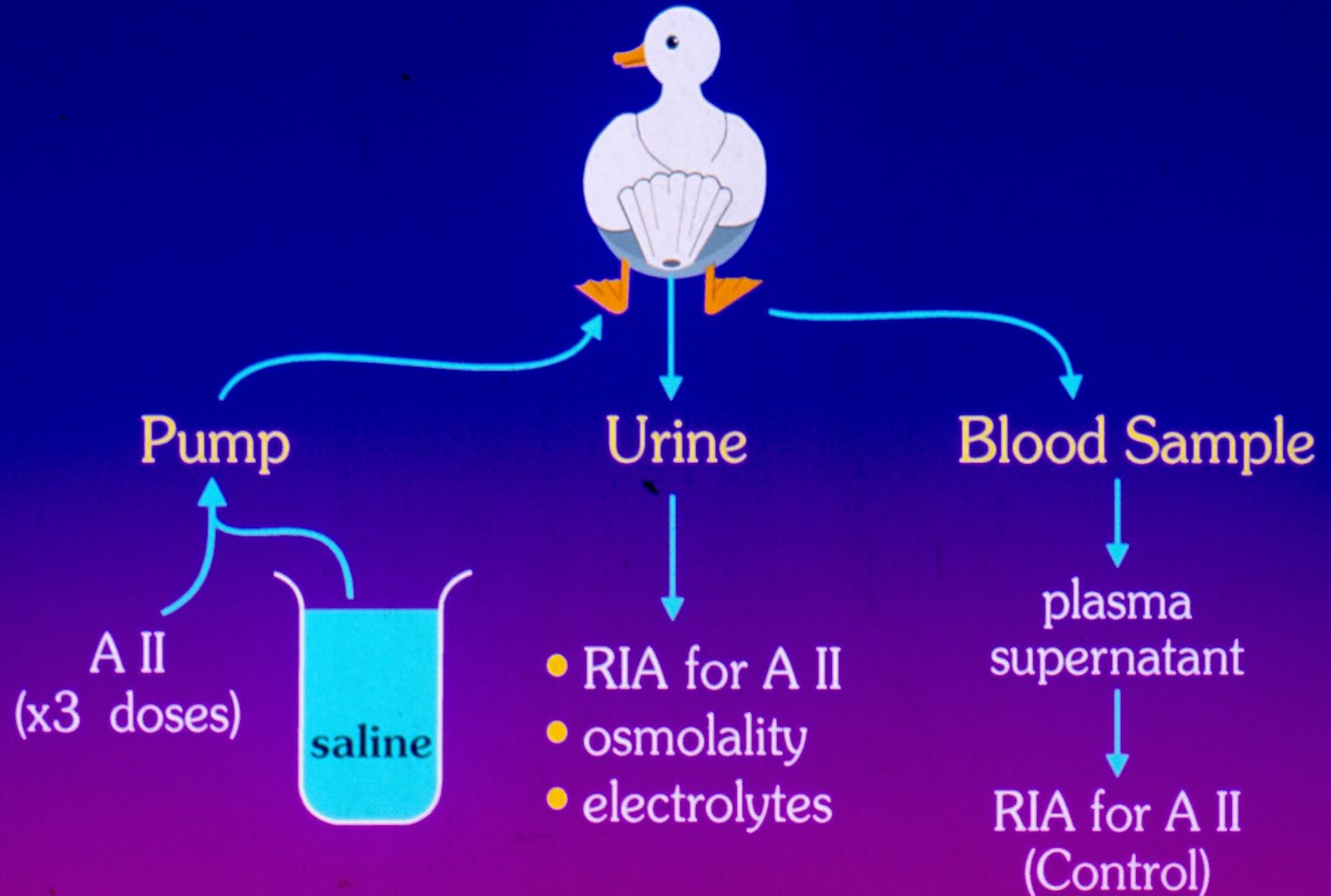


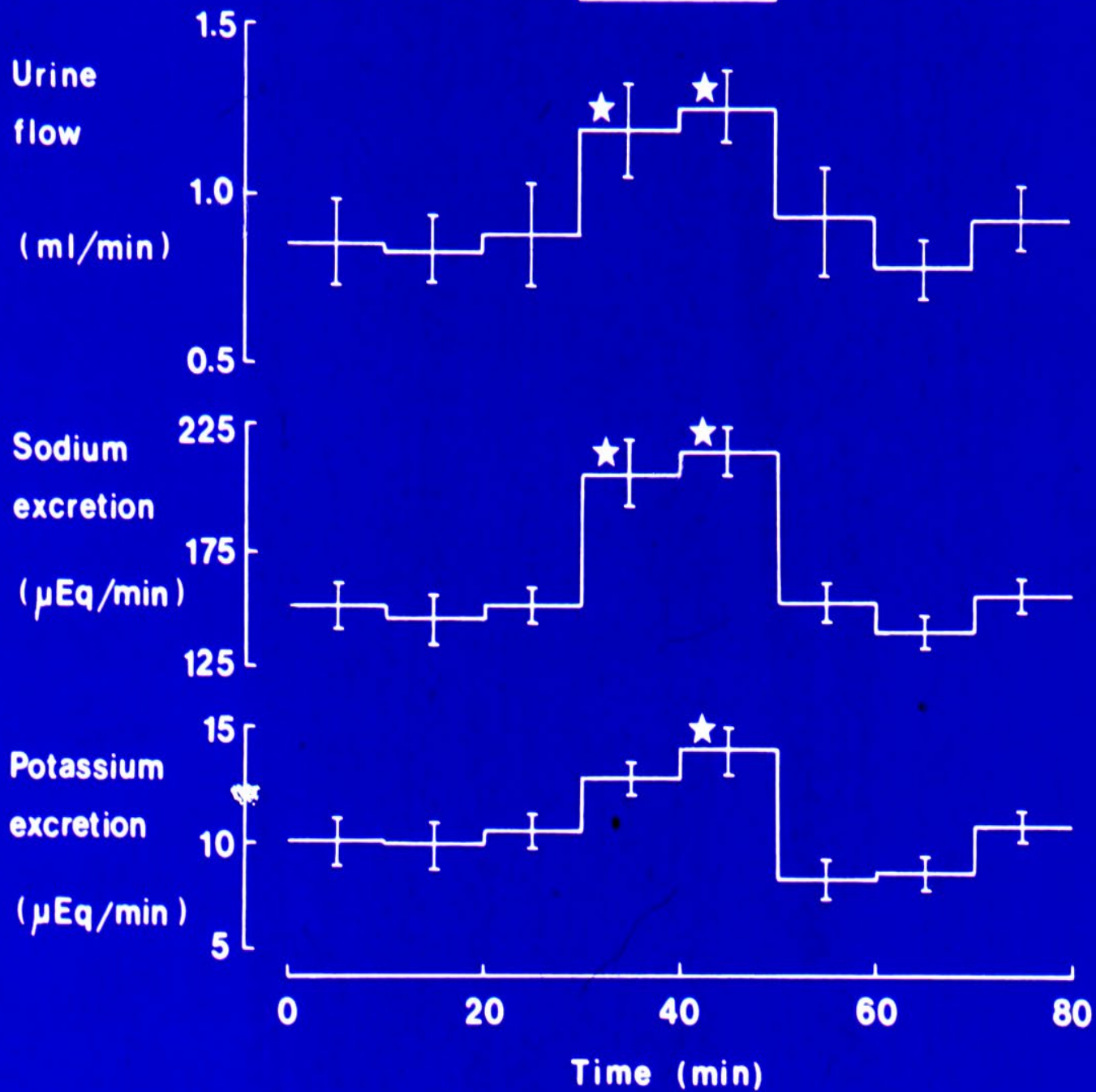




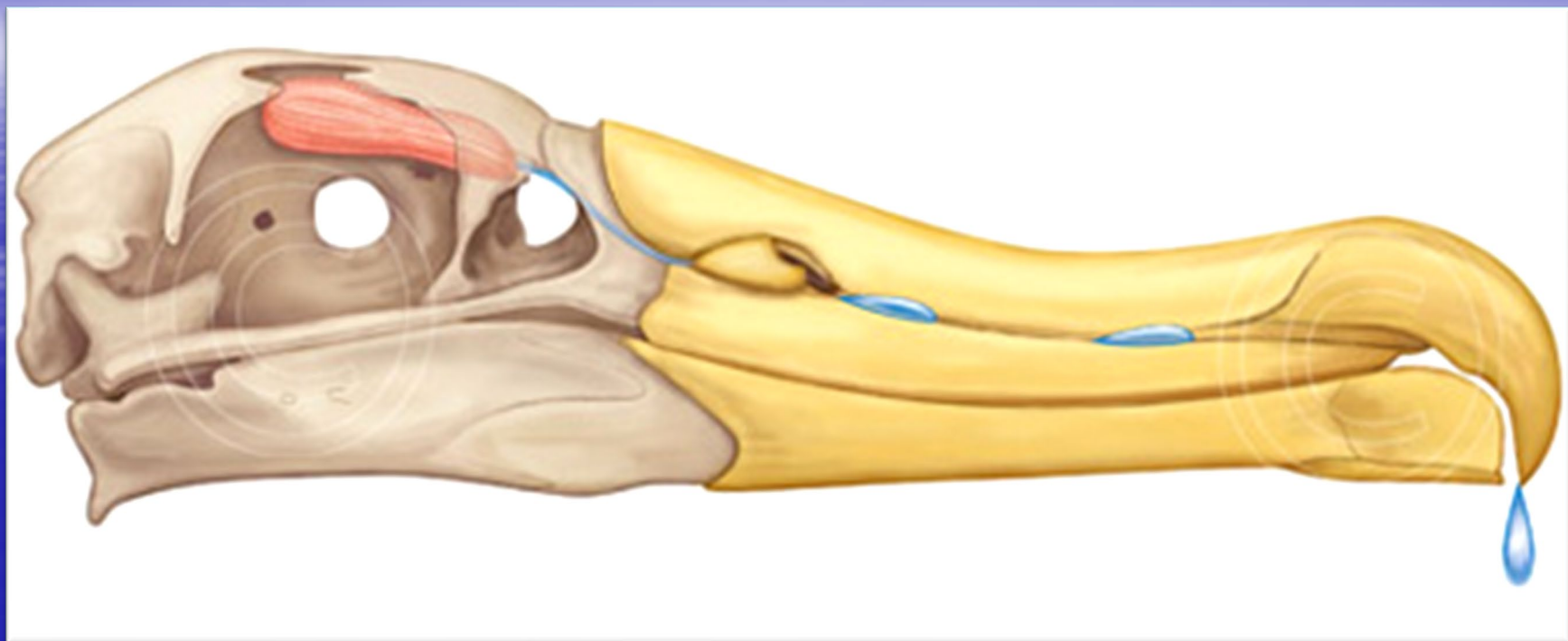


Experimental Procedure



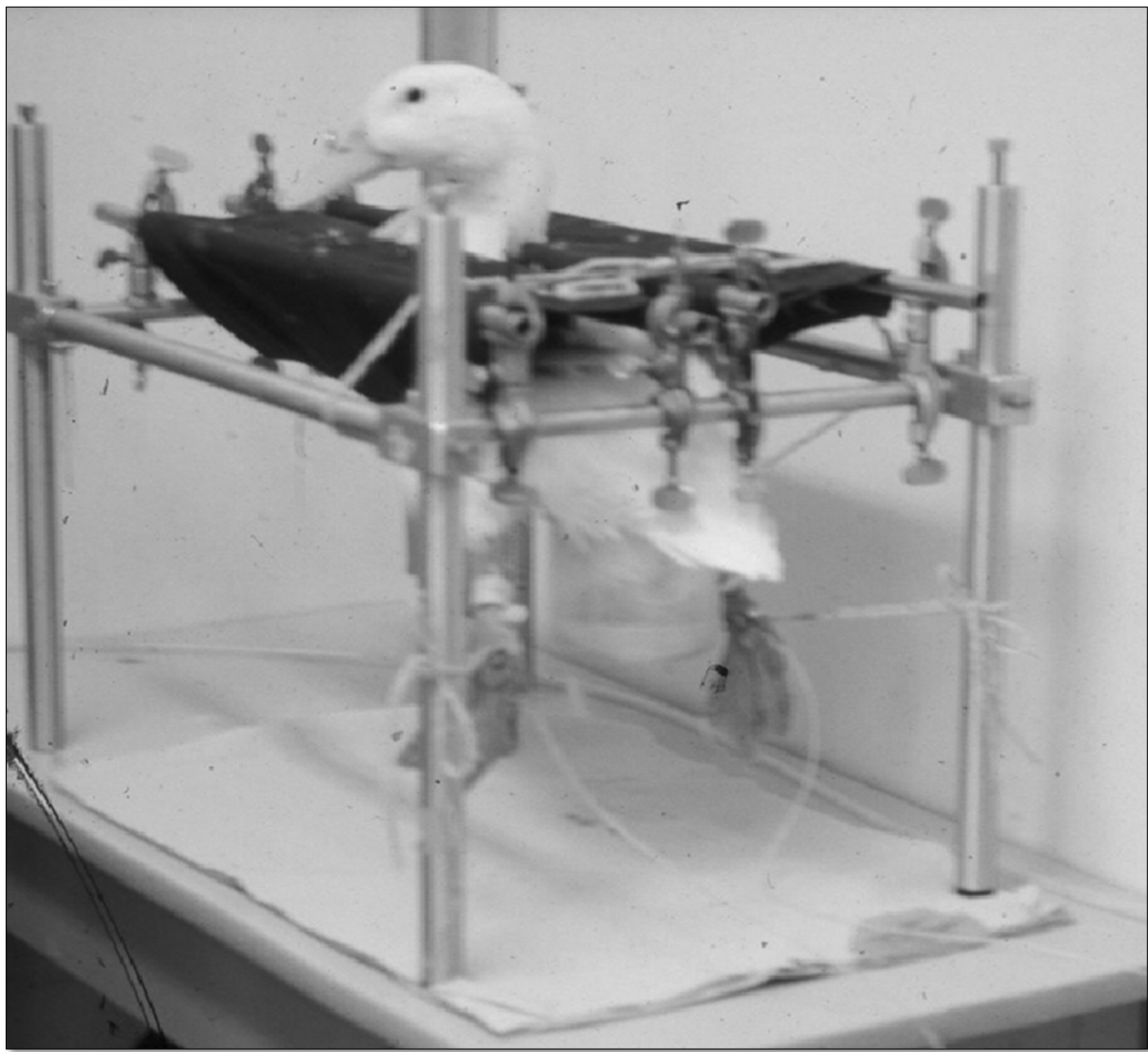


THE AVIAN SALT GLANDS

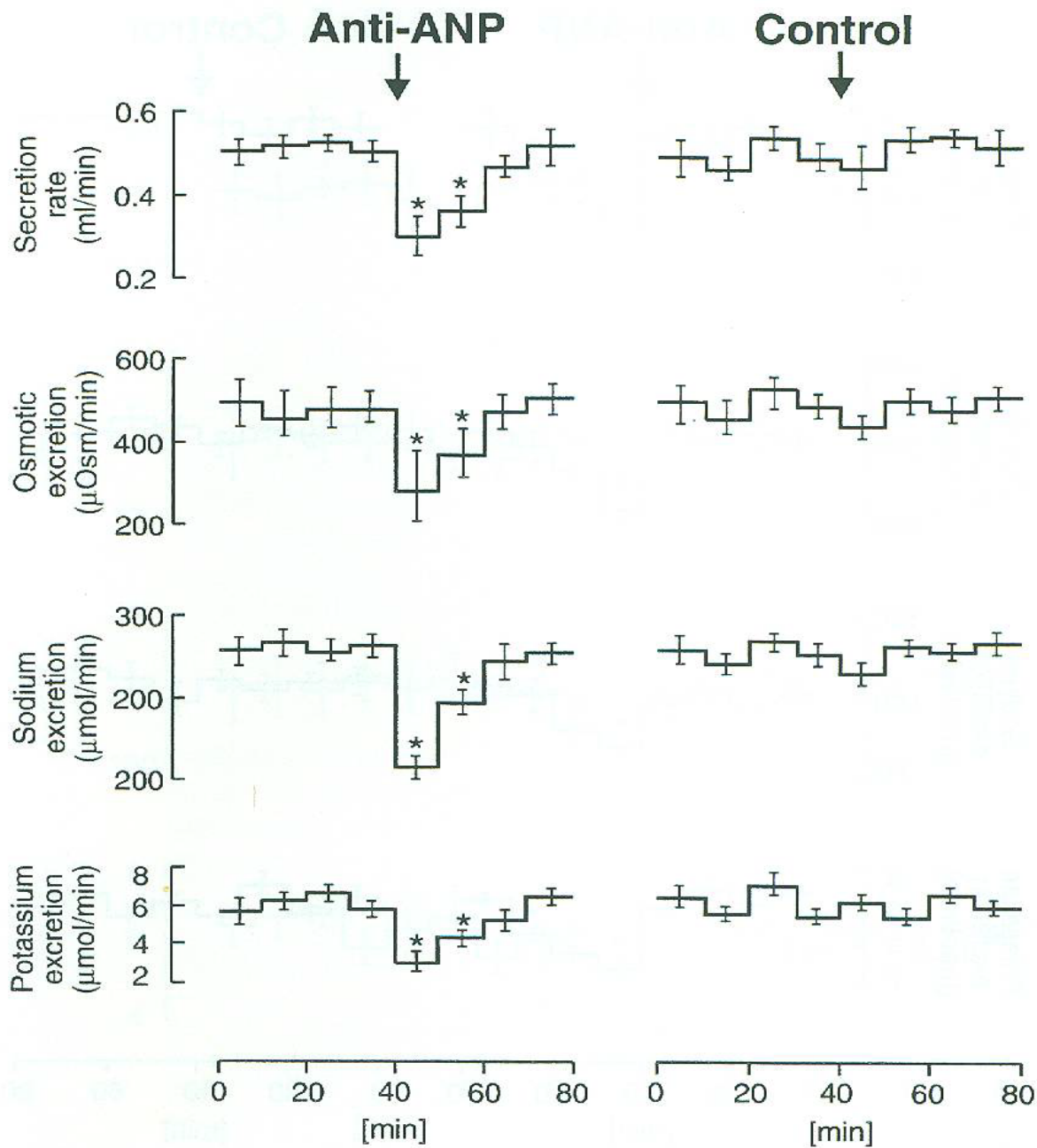




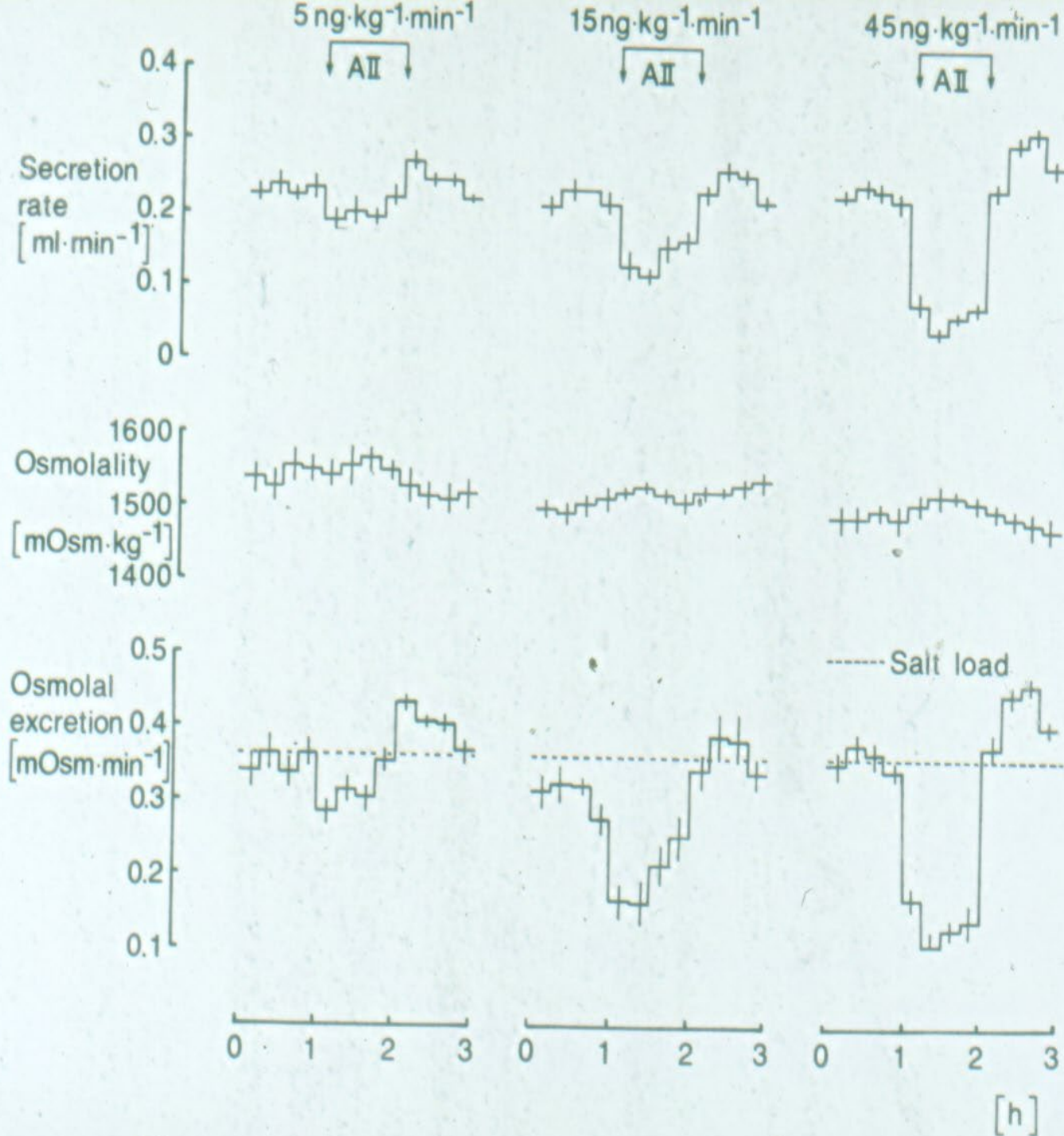












OTHER EXPERIMENTAL APPROACHES

- Intracerebroventricular (icv) application
- Receptor autoradiography

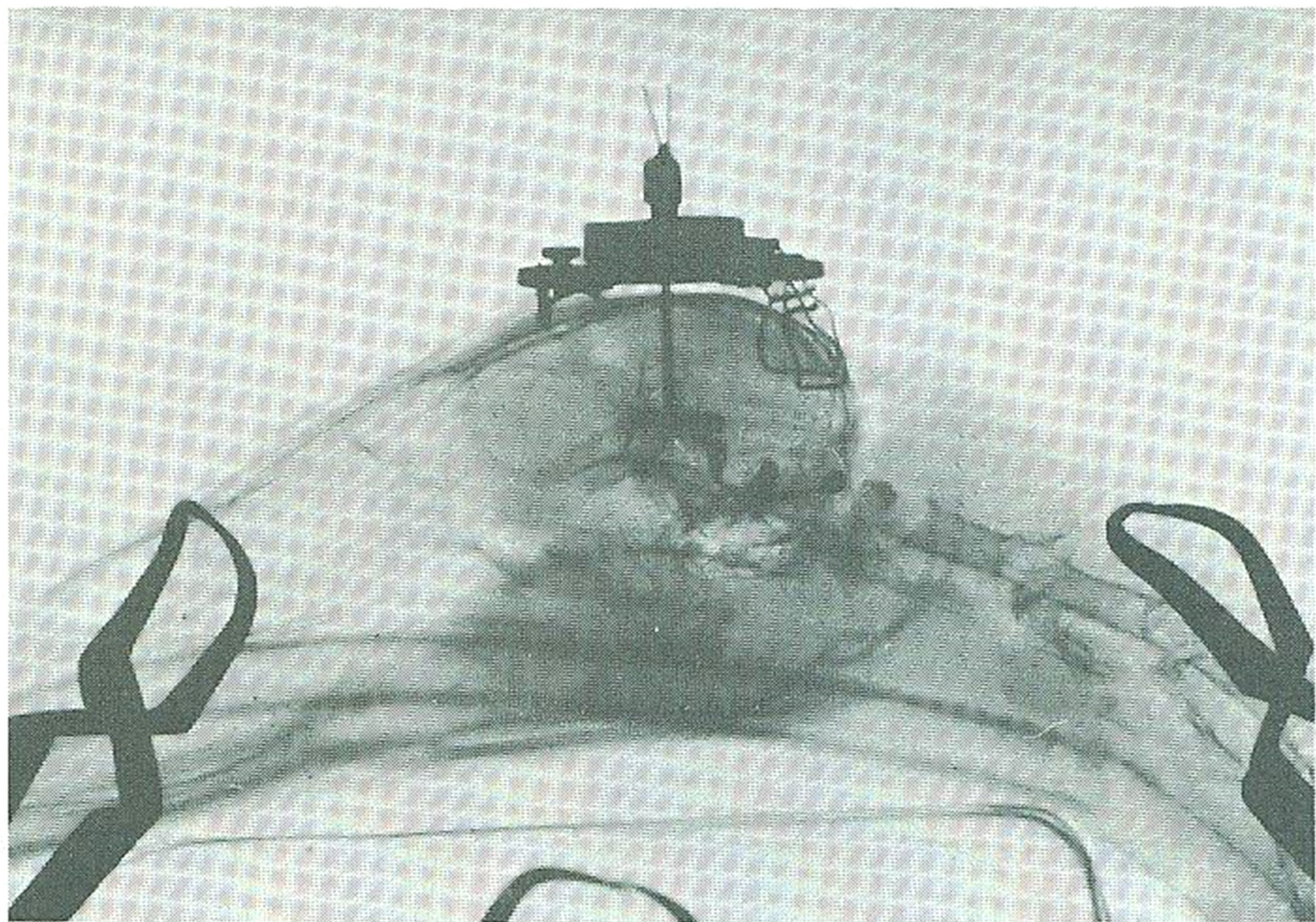
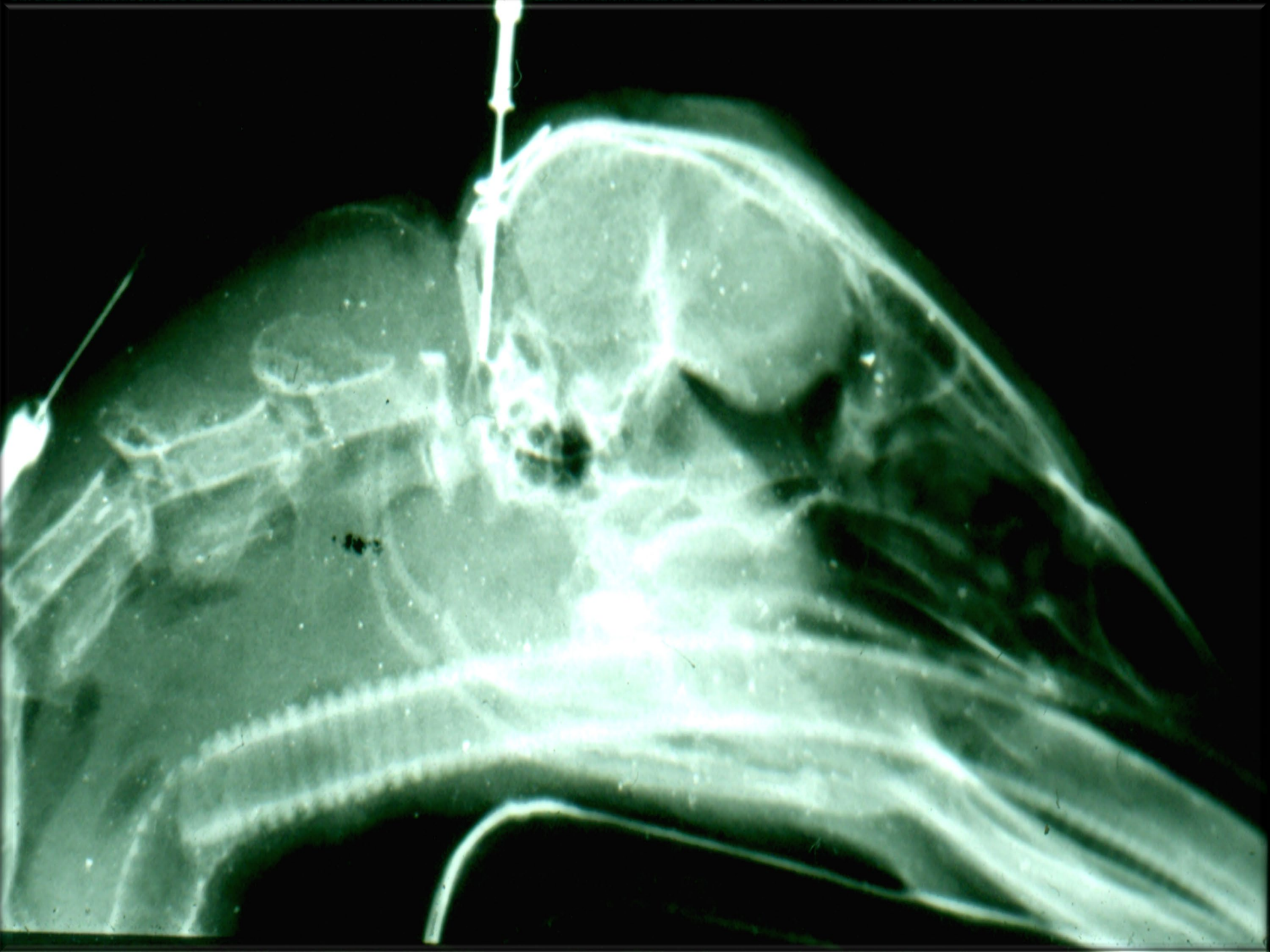
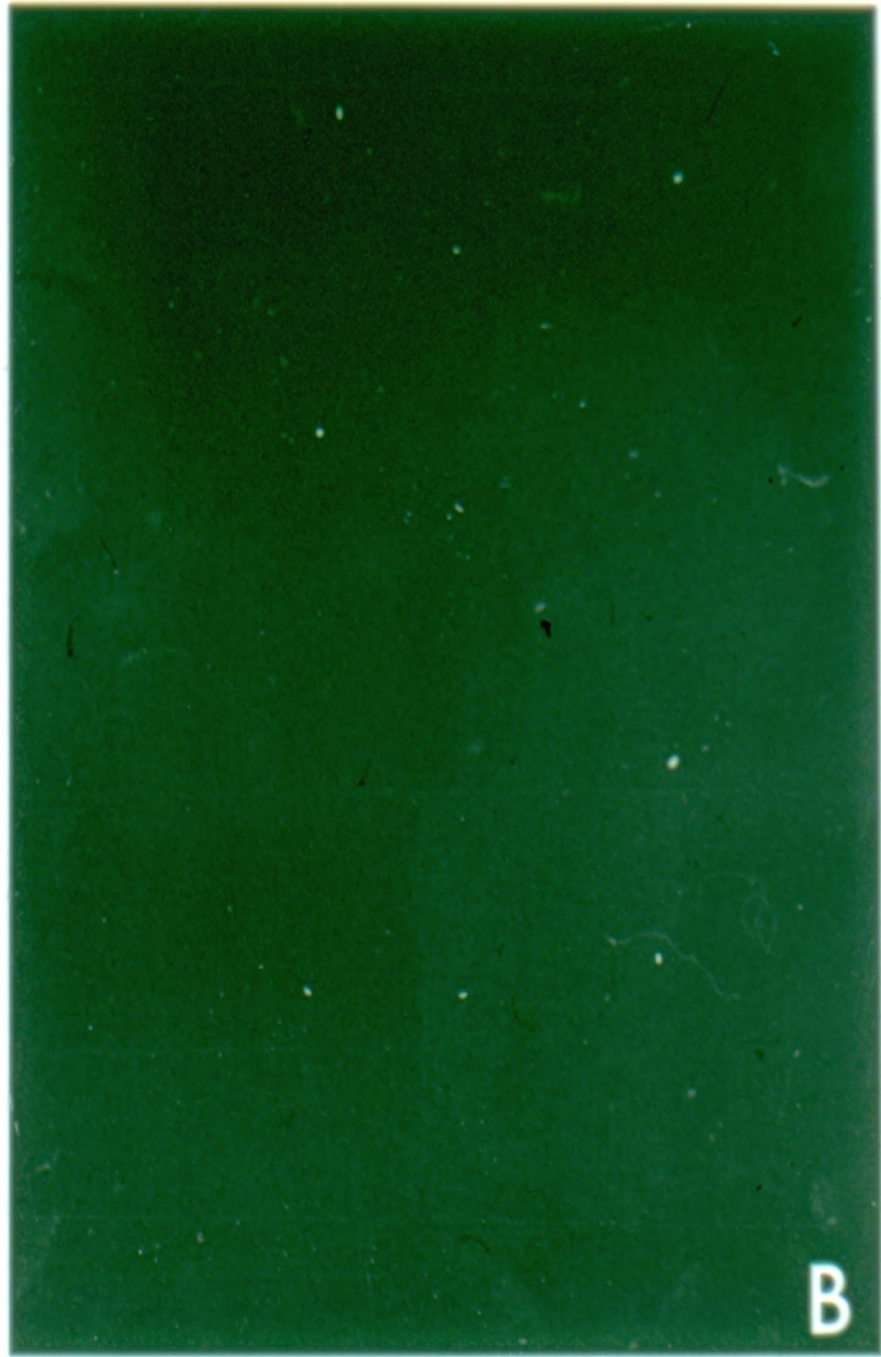
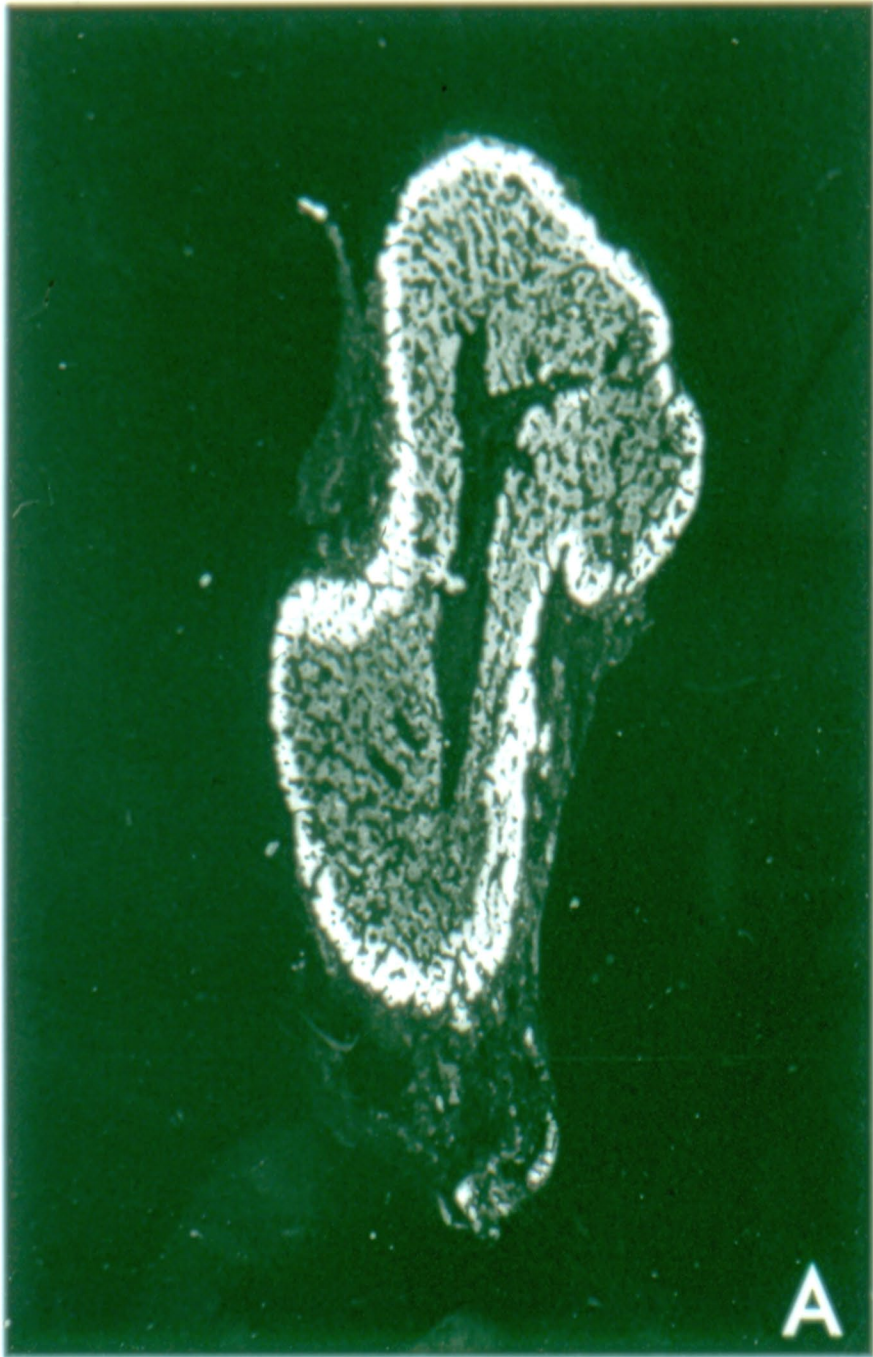
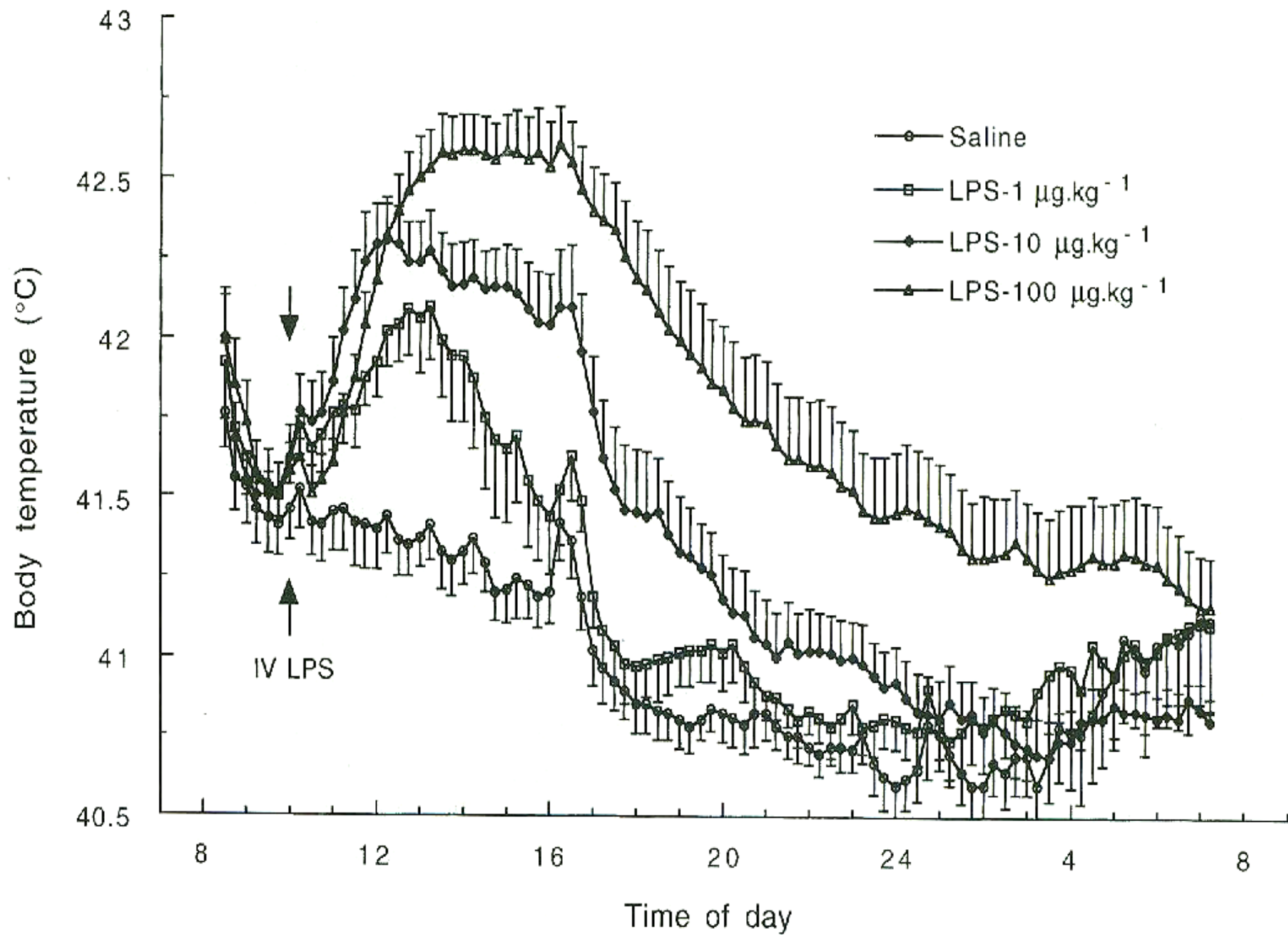


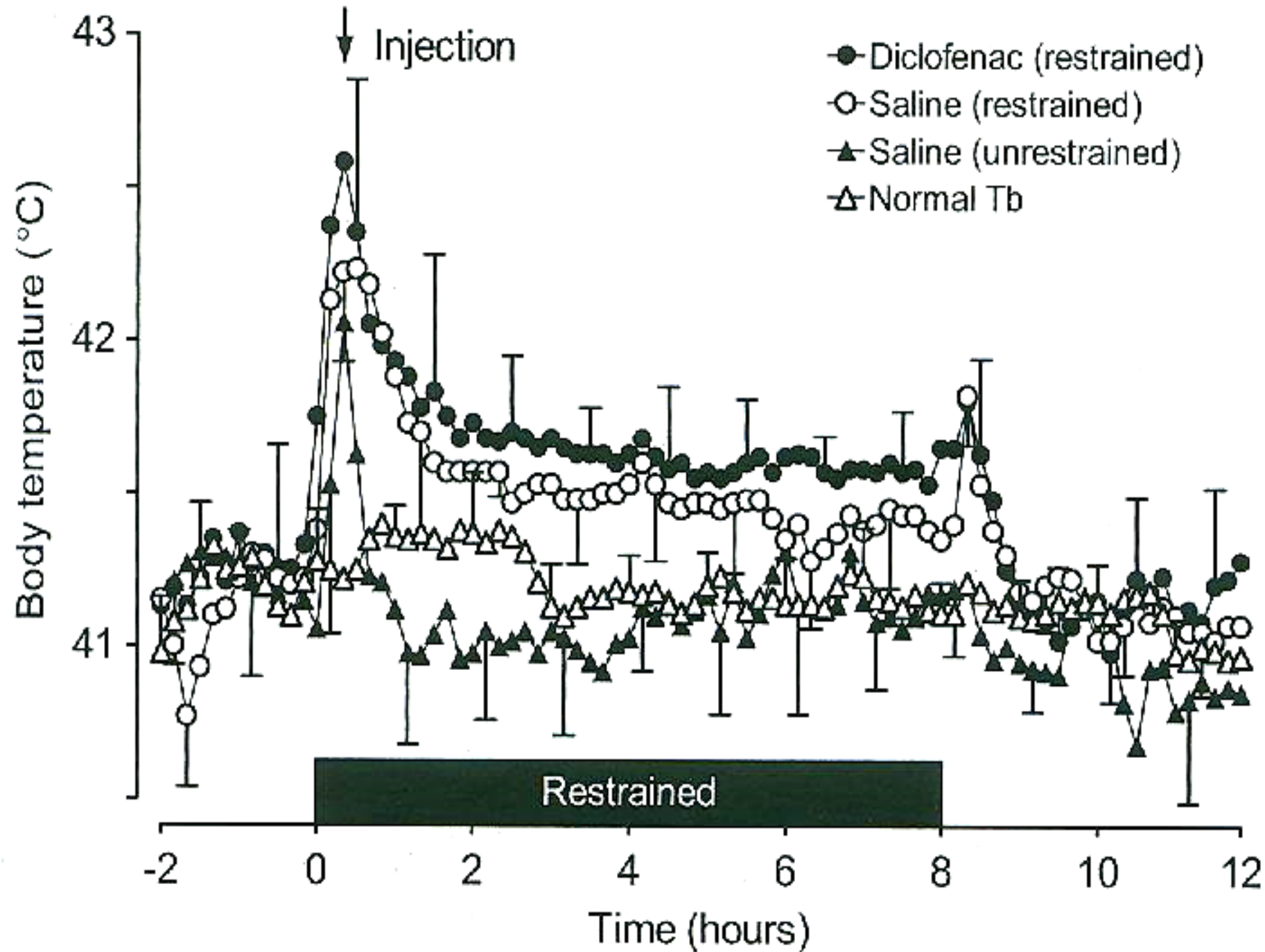
FIG. 1. Injection of contrast medium shows location of perfusion cannula in relation to cerebral ventricles.



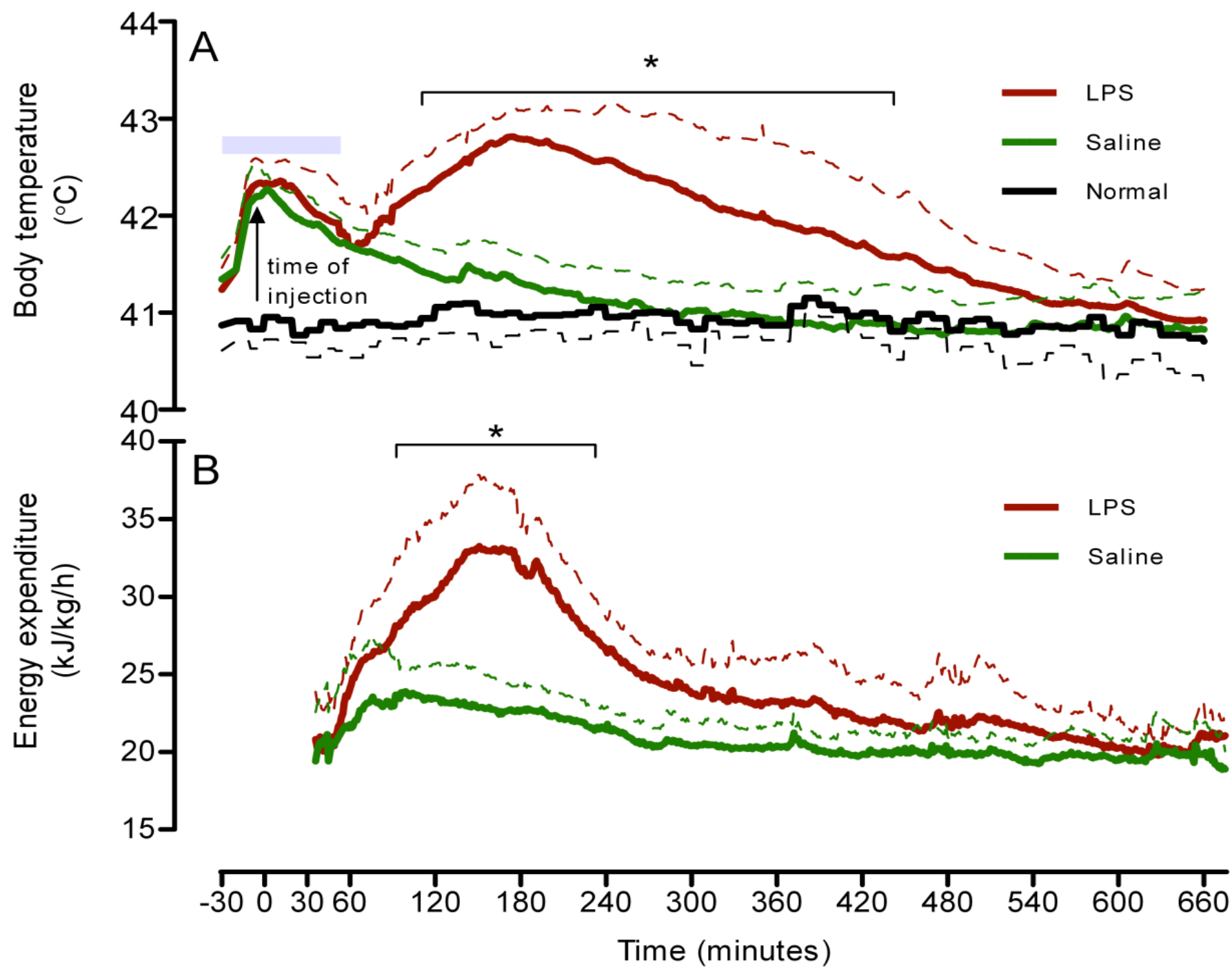


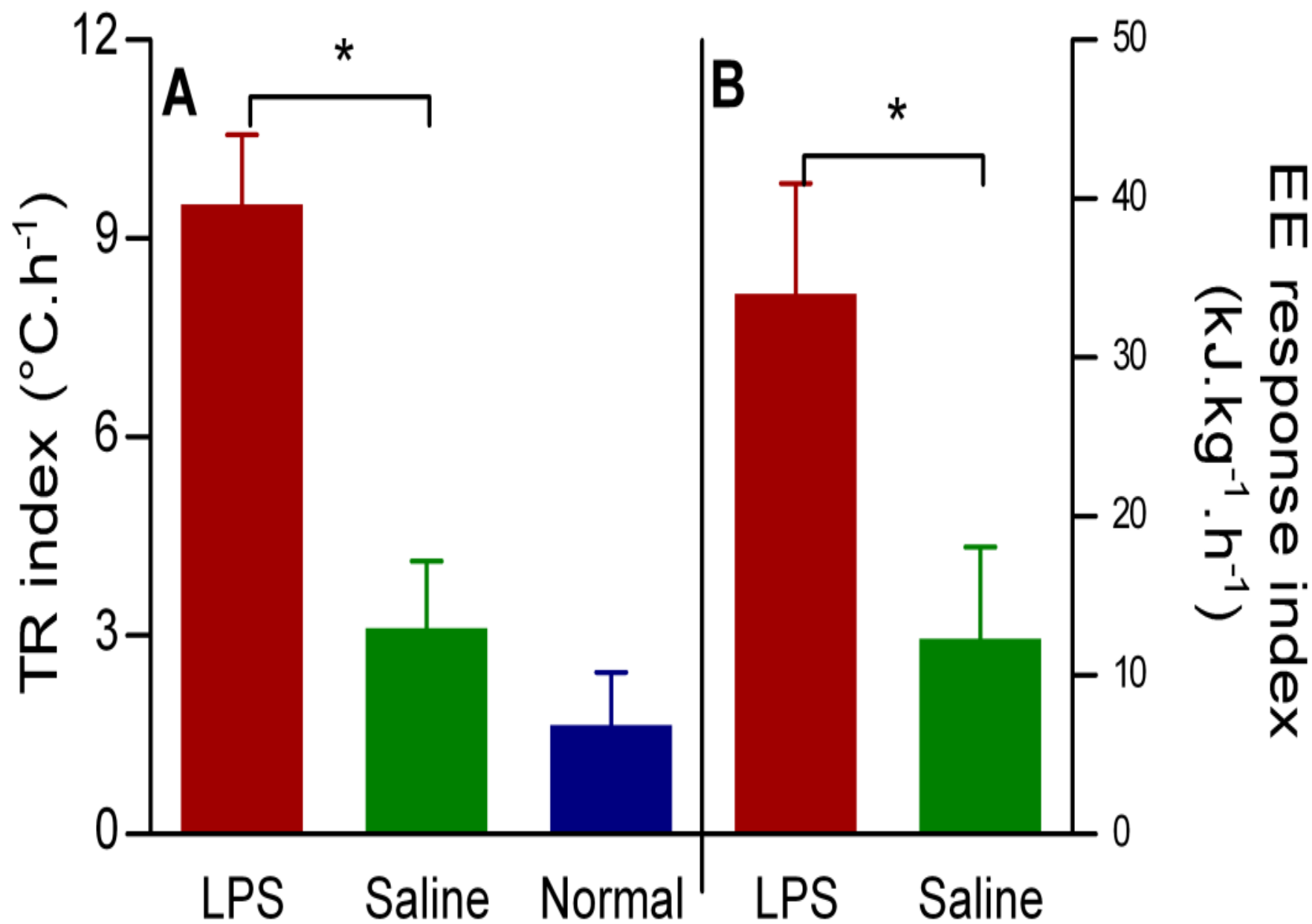
AVIAN FEVER

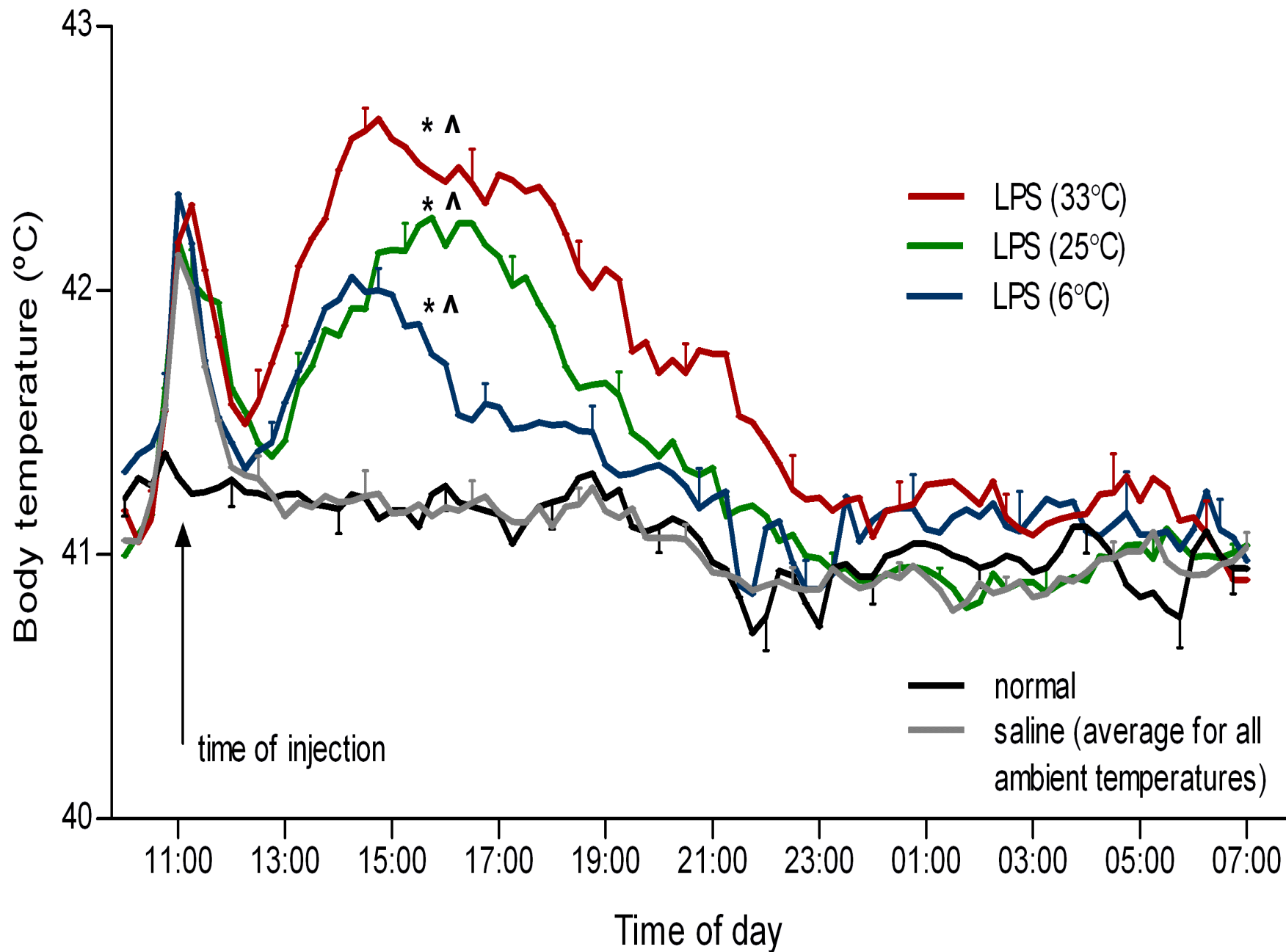


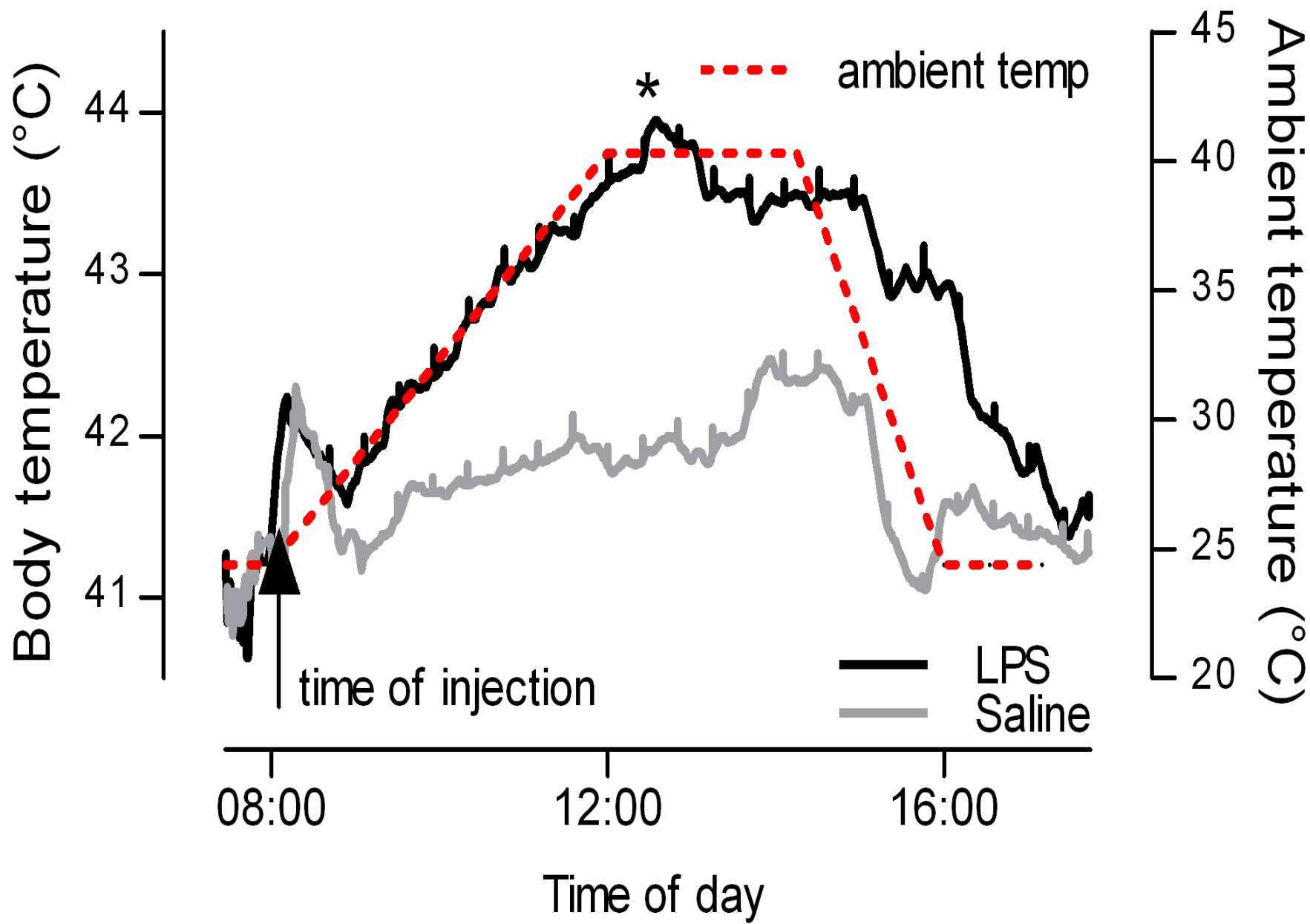


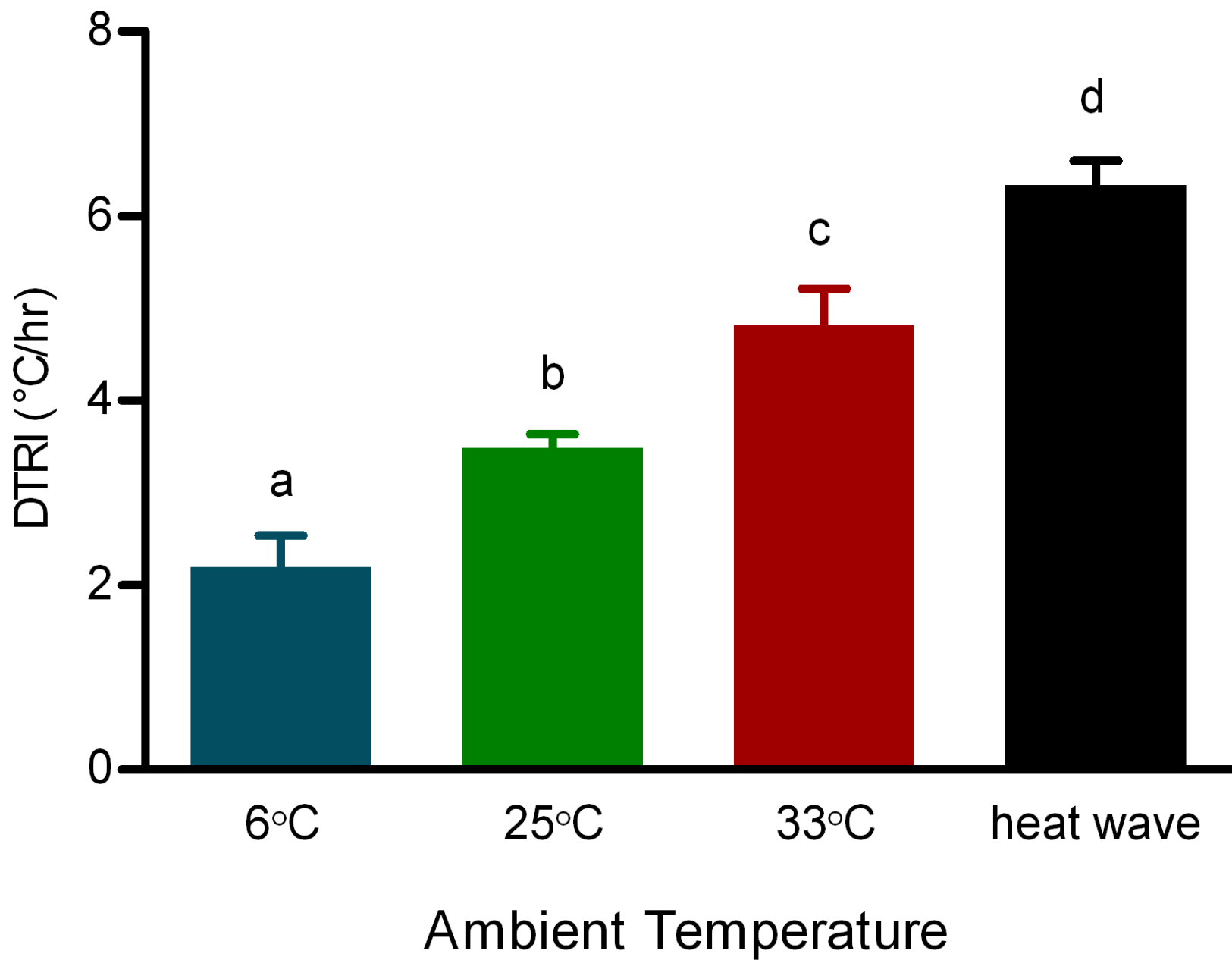












ACKNOWLEDGEMENTS

- Eckhart Simon, Christa Simon-Oppermann, Ted Hammel and Rudiger Gerstberger
- Shane Maloney and Manette Marais

Thank you!

