Table 2

GFR ml kg^{-1} hr^{-1}	Urine flow ml kg^{-1} hr^{-1}
Tadpoles	
cal. (20% E.F.) 35.1 ± 3.0	25.4 ± 3.8
cal. (30% E.F.) 23.5 ± 2.0	16.9 ± 2.5
measured	21.1 ± 2.1
Frogs	
cal. (20% E.F.) 79 ± 16	46 ± 13
cal. (30% E.F.) 52 ± 10	30 ± 9
measured	23 ± 5

extracellular fluid is 20% of body weight. In frogs this assumption considerably overestimates measured urine flow.

Table 3 gives the calculated osmotic and diffusional water fluxes. It appears that the osmotic and diffusional water fluxes are not significantly different in tadpoles, while in frogs the osmotic flux is about 5 times greater than the diffusional flux. The finding in frogs is in agreement with the finding by Hevesy, Hofer and Krogh (Skand. Arch. Physiol. 72:199-214, 1935) an indicates that osmotic flux occurs by bulk flow of water through water filled pores. The findin that the fully aquatic tadpoles do not show significantly different osmotic and diffusional water fluxes suggests that a change takes place in the structure of the skin between tadpoles and fro

Table 3

	Tadpoles	Frogs
	ml kg^{-1} hr^{-1}	
Diffusional flux	14.3 ± 0.8	5.72 ± 0.42
Osmotic flux	16.9 ± 2.5	30 ± 9
Osmotic fl./ diffusion/fl.	1.2	5.3

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EFFECTS OF BRAIN STIMULATION IN THE HARBOR SEAL (Phoca vitulina)

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We undertook to investigate the possibility of the existence of specific areas in the centr nervous system of the harbor seal (Phoca vitulina) from which circulatory responses resemb the ones obtained during diving, could be elicited by electrical stimulation.

Experiments were performed on eight seals, approximately four to eight months of age, anesthetized with intravenous alpha-chloralose and ventilated through a cuffed endotracheal tube using a piston pump. Aortic blood pressure was measured by cannulation of the external carotid artery with polyethylene tubing, connected to a Statham strain gauge and recorded using a multichannel oscilloscopic apparatus (Electronics for Medicine). In addition, in two seals renal and internal carotid blood flows were also measured, using an electromagnetic flowmeter (Biotronex) and cuff transducers. Brain stimulation was effected using coaxial electrodes positioned stereotactically, the animals being supported on a modified dog frame. Repetitive stimuli (100 cps 2-6v, 2msc) were delivered by a Grass S4 stimulator.

Stimulation of rostral portions of the mesencephalon and caudal hypothalamus resulted, in all seals, in immediate and profound bradycardia, from control heart rate levels of 110-140 beats per minute to 10-20 beats per minute. Mean aortic blood pressure either did not change or increased by 10 to 20% above control levels. These circulatory responses, following brain stimulation, could be elicited only during apnea, induced by stopping the action of the respiratory pump in expiration. During continued ventilation or in inspiratory apnea a previously successful stimulation no longer exerted its effects.

Renal blood flow ceased during brain stimulation and internal carotid blood flow was maintained.

Our findings indicate that it is possible to elicit in the anesthetized seal, by brain stimulation, a pattern of circulatory response which has great similarity to the one observed in normal dives of intact animals, with chronically implanted measuring devices.

This preparation could prove useful in subsequent experiments for the clarification of the neurological organization of the diving response in mammals as well as in the study of specific visceral adaptations of diving mammals, during anesthesia.

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