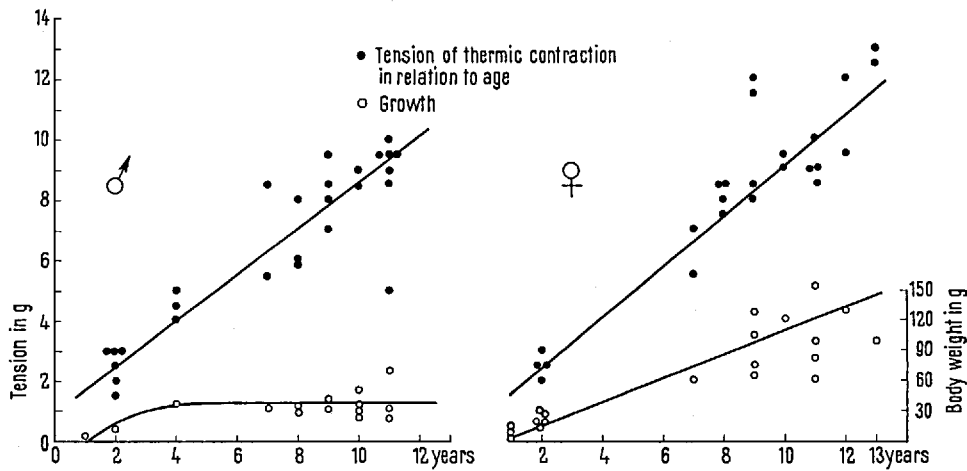


The Ageing of *Xenopus laevis*

Xenopus laevis, the South African claw frog, is often used for laboratory tests of gonadotrophic hormones, etc. Males are fully grown at 2 years of age and then maintain a weight of about 60 g. Females, on the contrary, continue to grow and, at the age of 12–13 years, they have a body weight of 100–150 g (Figure).



We tested whether collagen aged in these frogs in a similar way as in mammals. It had been shown¹ in the latter that, during thermic contraction (shrinkage), the isometric tension of tendon fibres, consisting of practically pure collagen, increases with age. This is explained as a consequence of the increase of cross-linkages in the collagen macromolecules with age. The fact that the quantity of hydroxyprolin-containing complexes which are liberated during thermic contraction, decreases with age, is a confirmation of the increased cross-linking in aged collagen².

These facts were originally discovered on the tail tendons of rats, and for hydroxyprolin also on cow-hide and human skin³.

We have now shown that in *Xenopus laevis* the same changes appear in the collagen of the tendons as in mammals. The tension of thermic contraction increases from 2.5 g in animals of 2 years of age to 10–11 g in 12–13 year old ones. These characteristic age changes are independent of the growth and the weight, which in old individuals are different for males and females, as seen in the Figure.

Thus the tension of the thermic contraction of tendon-(collagen)-fibres is a real measure of 'biological age' also in *Xenopus laevis*.

A detailed description will be given in 'Gerontologia'⁴.

Zusammenfassung. (1) Die Spannung, welche sich bei der thermischen Kontraktion einer Sehne entwickelt, ist charakteristisch für das Alter der Tiere. Daraus lassen sich

mit dem Alter fortschreitende Veränderungen des Collagens erkennen. (2) Bei *Xenopus laevis* zwischen 2 und 13 Jahren nimmt mit zunehmendem Alter dieser Wert, ebenso wie bei Säugetieren, zu, unbeeinflusst davon, dass das Wachstum der Weibchen viel grösser als das der Männchen ist.

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⁴ We thank Prof. F. E. LEHMANN in Bern and Prof. A. C. J. BURGERS in Utrecht for many animals.
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The Age Parameter of Pharmacological Activity

Toxic or pharmacological activity of drugs is generally tested on young animals only. We have recently made parallel measurements on rats of different ages from the same inbred colony. A number of different pharmacies were used and ten animals were always compared for each concentration and age group.

No age differences were found with substances with peripheral nerve ending activity, such as *Acetylcholin* and *Histamin*. They were tested on the surviving intestine of guinea pigs (Magnus preparation) with animals of the age of 2, 20, and 50–70 months.

Similarly the antagonistic inhibition of these with *Atropin* or *Sandosten* were unchanged in old age, as is shown in the Table.

Age months	Number of animals with threshold activity		Number of animals with inhibitory effect	
	Acetylcholin		Atropin	
	64 · 10 ⁻⁸	128 · 10 ⁻⁸	2.5 · 10 ⁻⁸	1.125 · 10 ⁻⁸
2	6	4	2	8
20	5	5	1	9
50-70	4	6	5	5
	Histamin		Sandosten	
	1.28 · 10 ⁻⁹	2.56 · 10 ⁻⁹	25 · 10 ⁻⁶	1.25 · 10 ⁻⁶
2	1	7	5	5
20	4	4	4	6
50-70	3	4	4	6

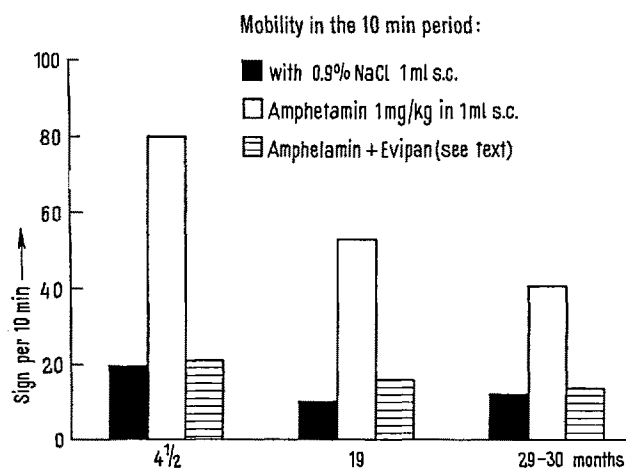


Fig. 1

Substances which act upon the central nervous system behave in a very different way. The narcotic action of *Hexobarbital* (Evipan) with i.p. injections was complete with 80 mg/kg in 4 to 5 months (i.e. young) rats, whereas in 29–32 months old rats even 50 mg/kg gave complete narcosis.

The central excitant *Amphetamine* (Benzedrine) in a dose of 1 mg/kg produces spontaneous motor excitation of a high degree and long duration in young, and much less and shorter in aged rats, as Figure 1 shows.

Also the antagonistic inhibition of the motor excitation by *Hexobarbital* is attained with 90 mg/kg in 4–5 months old animals, while in old animals of 19 months 40 mg/kg, and of 29–31 months only 30 mg/kg was needed.

The same differences were found for the psychomotor stimulant *Ritalin* (10 mg/kg s.c.) and the inhibitory effect on it with *Regitin*. The latter inhibits in doses of 50 mg/kg in 4–5 months old rats, and 30 mg/kg in 29–31 months old animals.

Thalamic centres of old animals also show a decreased sensitivity with ageing. The dosage of *Procaïn* (Novocain) (i.m. 10 mg/100 g) which decreases the body temperature by 1.5°C in young guinea pigs, decreases it by 2°C in 3 1/2 and 6 1/2 years old animals. More characteristic is that normal body temperature was reached again after 110 min in 6 months old and after 210 min in the 3 1/2 and 6 1/2 years old animals.

Similarly, the centre which regulates food intake by appetite and hunger, is much more influenced by a dose of 1 mg/kg *Preludin* in 29–31 months old rats (causing 35% decrease of food intake) than in 11 months old animals,

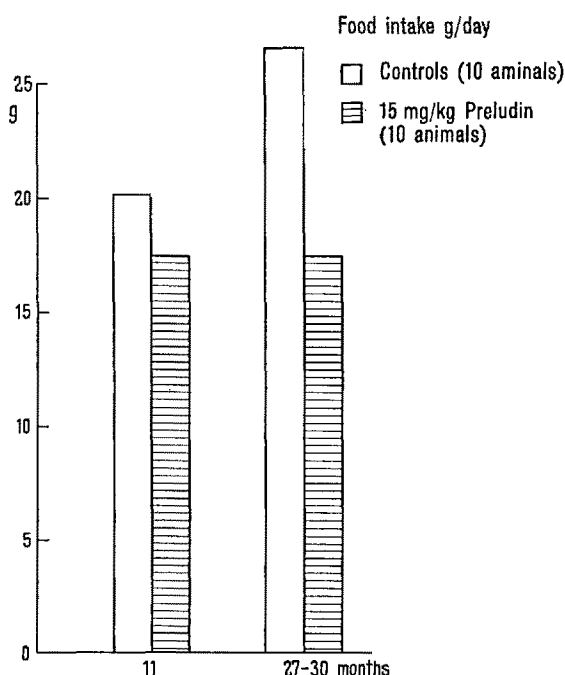


Fig. 2

where the food intake was decreased only 12%. Similar results were obtained with *Benzedrine* (Figure 2).

For an explanation of these changes with age, it might be remembered that for different parts of the central nervous system a decrease of the quantity of grey matter, i.e. of nerve cells, has been shown in old animals. This may be the cause of the diminished activity of stimulants and an increase of inhibitory influences of substances with depressive action.

A detailed description is given in 'Gerontologia'.

Zusammenfassung. Je nach dem Alter wirken Pharmaka sehr verschieden. Hexobarbital ist bei alten Tieren stärker narkotisch; Amphetamin und Ritalin weniger erregend; Amphetamin und Preludin wirken stärker appetithemmend und nach Novokain ist die Hemmung der Wärmeregulation stärker bei alten Tieren. Peripher angreifende Pharmaka zeigen keine Unterschiede.

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Action d'une irradiation générale sur les échanges d'eau entre le sang et la cavité gastrique pendant l'absorption du glucose

Dans un travail antérieur¹ nous avons constaté qu'une irradiation générale par les rayons X ralentit l'absorption intestinale du glucose. Ayant calculé que ce ralentissement n'est dû qu'en partie à la diminution de tolérance aux glucides qui se développe au même moment^{2,3}, nous avons exploré un métabolisme très radiosensible⁴ qui joue un rôle important dans l'absorption intestinale^{5,6}, le métabolisme de l'eau, en nous limitant dans cette note à ce qui se passe dans l'estomac après l'ingestion d'une dose

unique de glucose (1100 mg dans une solution à 135 mg/cm³). Nos expériences ont porté sur 30 cobayes

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