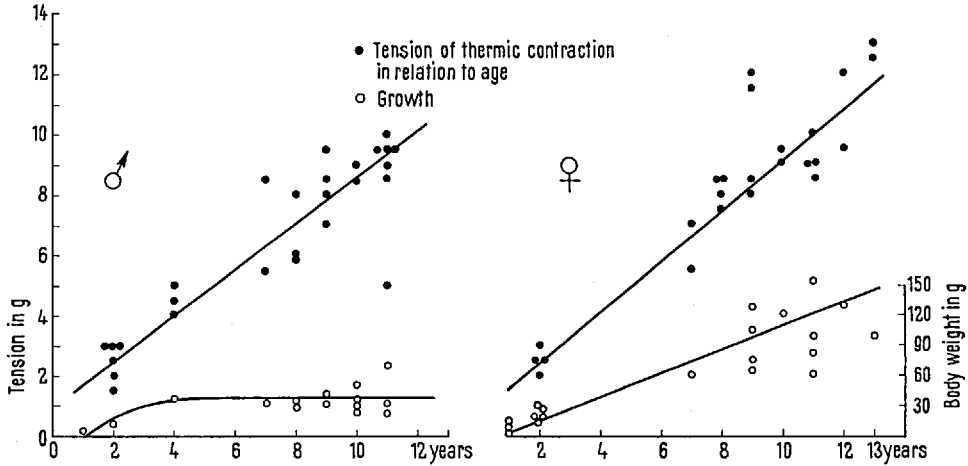


**The Ageing of *Xenopus laevis***

*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 shown<sup>1</sup> 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 collagen<sup>2</sup>.

These facts were originally discovered on the tail tendons of rats, and for hydroxyprolin also on cow-hide and human skin<sup>3</sup>.

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'<sup>4</sup>.

*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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<sup>1</sup> F. VERZÁR, *Gerontologia* 1, 363 (1957); 2, 81 (1958).

<sup>2</sup> A. MEYER and F. VERZÁR, *Gerontologia* 3, 288 (1959).

<sup>3</sup> F. VERZÁR, *Gerontologia* 4, 105 (1960).

<sup>4</sup> 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 64 · 10 <sup>-8</sup>	128 · 10 <sup>-8</sup>	Atropin 2.5 · 10 <sup>-8</sup>	1.125 · 10 <sup>-8</sup>	
2	6	4	2	8	
20	5	5	1	9	
50-70	4	6	5	5	
	Histamin 1.28 · 10 <sup>-9</sup>			Sandosten 25 · 10 <sup>-6</sup>	
	2.56 · 10 <sup>-9</sup>	5.12 · 10 <sup>-9</sup>	25 · 10 <sup>-6</sup>	1.25 · 10 <sup>-6</sup>	
2	1	7	3	5	5
20	4	4	2	4	6
50-70	3	4	3	4	6