

permanent vaginal dioestrus in the female do not cause hypertrophy of the hypophysis in either sex. In these respects, the effect of testosterone on somatic and hypophyseal growth differs from that of oestrone.

9243

Action of Arasaponins A and B.

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The Chinese drug San-ch'i has been botanically identified as *Gynura pinnatifida*,^{1, 2} although it has been named *Aralia bipinnatifida*³ by Y. H. Chao. The plant is a short herb grown in south-western China. The root is the part that has been advocated in Chinese medicine chiefly as an astringent and hemostatic. In a previous note,³ one of us (T. Q. C.) reported the isolation of 2 saponins from San-ch'i, arasaponin A and arasaponin B. The former melts at 195-210°C., has a specific rotation $[\alpha]_D +23^\circ$, and conforms to the empirical formula $C_{30}H_{52}O_{10}$; while arasaponin B melts at 190-200°C., is also dextro-rotatory ($[\alpha]_D +8^\circ$), and has an empirical formula $C_{23}H_{38}O_{10}$. Both substances are moderately soluble in water, foam forming upon agitation.

Hemolysis experiments, 14 in all, were carried out according to the method described by Ponder⁴ with both saponins at 37°C. It was found that arasaponin A laked a guinea pig's red cells in the concentration of 1:4000 within 2 hours 43 minutes. Solutions of 1:2500, 1:2000, 1:1000, 1:750, 1:500, and 1:250 were more readily effective, but it still required 1 hour 14 minutes. Weaker concentrations, such as 1:5000, 1:8000, and 1:10,000, had no hemolytic action at the end of 8 hours. Arasaponin A also hemolyzed dogs' and monkeys' blood, but the latent period was very long. For example, a 1:250 solution laked a dog's red cells in 4 hours 34

¹ *Botanica Nomenclature*, Commercial Press, Shanghai, 1917, p. 23.

² Chen, C. J., *Encyclopædia of Chinese Materia Medica*, The World Press, Shanghai, 1924, 1, 38.

³ Chou, T. Q., and Chu, J. H., *Proc. Chinese Physiol. Soc.*, Tsingtao Meeting, 1936, p. 12.

⁴ Ponder, E., *The Mammalian Red Cell and the Properties of Hæmolytic Systems*, G. Borntraeger, Berlin, 1934, p. 139.

minutes, and the same concentration caused complete lysis in a monkey's erythrocytes in 17 hours 44 minutes. No hemolytic action was observed with arasaponin A upon rabbits', sheep's, or pigeons' red blood cells.

Arasaponin B hemolyzed the red corpuscles of guinea pigs, dogs, and rabbits, although it required a long latent period even with concentrated solutions. For example, a concentration of 1:250 laked a guinea pig's erythrocytes in 3 hours, a dog's in 4 hours 36 minutes, and a rabbit's in 5 hours 16 minutes. No hemolysis took place with monkeys', sheep's, or pigeons' blood at the end of 24 hours, a 1:250 solution of arasaponin B being employed.

When injected intravenously into an etherized cat, neither arasaponin altered the level of blood pressure, the heart rate, or the respiratory rate, in doses varying from 1 to 20 mg. Similarly, no effect was noted on the motility of the isolated guinea pig's uterus, or the isolated rabbit's intestines, in concentrations of 1:50,000 and 1:25,000.

TABLE I.
Toxicity of Arasaponins A and B in Albino Mice by Intravenous Injection.

Arasaponin	Dose, mg. per kg.	No. of mice injected	No. of mice died	Minimal lethal dose, mg. per kg.
A	300	2	0	460
	350	2	0	
	370	2	0	
	400	2	0	
	420	5	1	
	440	5	1	
	460	5	4	
B	200	2	0	300
	220	2	0	
	240	2	0	
	260	4	0	
	280	5	2	
	300	5	3	
	320	2	2	

As shown in Table I, the minimal lethal dose of arasaponin A is 460 mg. per kg. in white mice by intravenous injection, and that of arasaponin B 300 mg. per kg. A 2% solution was used in each case. Death, as a rule, was prompt, although a few animals lingered for 20 to 30 minutes, or longer. A group of 6 guinea pigs survived doses of arasaponin A or B varying from 100 to 300 mg. per kg., administered by the saphenous vein. Erection of hair was the only sign observed. Gold fish immersed in arasaponins A and B for 24 hours were not affected in concentrations of 1:500, 1:1000, and

1:10,000, except in one instance a fish finally died in a 1:1000 solution of arasaponin A.

Summary. The pharmacologic action of arasaponins A and B, isolated from the Chinese drug San-ch'i, has been investigated. Arasaponin A possesses a hemolytic action on the erythrocytes of guinea pigs, dogs, and monkeys. It has a minimal lethal dose of 460 mg. per kg. in mice by intravenous injection. Arasaponin B has a hemolytic action upon the red blood cells of guinea pigs, dogs, and rabbits. Its minimal lethal dose in mice is 300 mg. per kg. when injected by the tail vein.

9244

Prolonged Splanchnic Stimulation.*

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An attempt was made to determine the effect of prolonged bilateral electrical stimulation of the splanchnic pathways of a dog upon the level of systolic blood pressure.

Blood pressure records were made by connecting a van Leersum carotid flap to a "Tycos" recording sphygmomanometer by means of especially constructed rubber bags and rigid tubing. The method has been checked against optical manometry and gives results consistently about 10% high; more than 2000 determinations in 8 dogs convinced us of its efficiency.

Stimulation was provided by a method involving the use of surgically implanted secondary units excited by a primary field in which the animal is free to move.¹ A frequency of 60 cycles was used at 6-8 volts.

Following construction of a carotid flap the subject, a robust 12-kilo male terrier, was trained over a period of several weeks to lie quietly during blood pressure determinations. In the following 3 weeks 89 records were made to serve as a base line. The average systolic pressure during this time was 143 mm. Hg. (all figures refer to records obtained by our method). Then and subsequently, except when the conditions of an intercurrent experiment dictated other-

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¹ Fender, Frederick A., *Am. J. Physiol.*, 1936, **116**, 47.