BIBLIOGRAPHY

ชัญโญ เพ็ญชาติ, ประยูร ดีมา, มุกดา ตฤษณานนท์ และ อลัน อิษวาส "อภิปรายเรื่องพิษ" วารสารกรมการแพทย์และอนามัย ปีที่ 2 ฉบับที่ 3 (2517) : 303-311, 329-330.

Aung-Khin, M. "Histological and Ultrastructural Change of Kidney in Renal Failure After Viper Envenomation" Toxicon 16(1978) : 71-75.

Bell, R.D., Mandal, A.K. and Paker, D.E. "The effect of Splenectomy on Renal Function in Epinephrine Induced Renal Failure" Proc. Soc. Exp. Biol. Med. 167(1981) : 12-14.

Bruninga, G.L. "Complement : A Review of the Chemistry and Reduction Mechanism" Am J. Clin. Path. 55(1971) : 273-282.

Chaiyabutr,N.,Faulkner,A. and Peaker,M. "Effects of Starvation on the Cardiovascular System, Water Balance and Milk Secretion in Lactating Goat" Res. Vet. Sci. 28(1980) : 291-295.

Chaiyabutr, N., Pichaicharnarong,A., Tungthanathanich, P., Sitprija,V., Loypetjra, P., "Observations on General Circulation and Renal Hemodynamics of Experimental Dogs given Russell's viper venom" Thai. J. Vet. Med. 14(4),(1984) : 257-270.

Chaiyabutr, N., "Physiological effects of Russell's viper venom on the kidney function" in Symposium and Lecture 14 th Annual Meeting of the Physiological Society (Thailand) pp. 43-50. Chonburi, 1985.

Chaiyabutr, N., Sitprija, V., Sugino, N. and Hoshi, T. "Russell's viper venom induced depolarization in the proximal tubule of Triturus kidney" Thai. J. Vet. Med. 15(4),(1985) : 297-303.

Chopra, R.N. and Chowhan, J.S. "Action of the Indian Daboia (Viper russellii) Venom on the Circulatory System" Indian J. Med. Res. 21(3),(1934) : 493-506.

Chugh, K.S., Aikat, B.K. Sharma, B.K.,Dash, S.C., Mathew, M.T. and Das, K.C. "Acute Renal Failure Following Snakebite" Am.J. Trop.Med. 24(24),(1975) : 692-697.

Corcondilas, A., Donald, D.E., and Shepherd, J.T. "Assessment by two independent methods of the role of cardiac output in the pressor response to carotid occlusion" J.Physiol. 170,(1964) : 250-262.

Ganong, W.F. Circulation, in Review of Medical Physiology. 8 th ed. pp. 464-473, Lange Medical Publications, 1977.

Gerber, J.G., Nies, A.S., Freiesinger, G.C., Gerkens, J.F., Branch, R.A., and Oates, J.A. "The effects of PGI_2 on canine renal function and hemodynamics. Prostaglandins. 16(1978) : 519-528.

Hadler,W.A. and Brazil, O.V. "Pharmacology of Crystalline Crotoxin. IV Nephrotoxicity" Mem. Inst. Butantan. 33(1966) : 1001-1008.

Hamilton, W.F., Riley, R.L., Attyah, A.M., Andre Cournand, D.M., Fawell, A., Himmelstein, R.P., Noble, J.W., Remington, D.W., Richard, Jr., Wheeler, N.C. and Witham, A.C. "Comparison of the Fick and Dye Injection Method of Measuring the Cardiac Output in Man" Am. J. Physiol. 153(1948) : 309-321.

Harris, R.C., Hurst, P.E. and Saker, B.M. "Renal Failure After Snake Bite" Med. J. Aust. 2(1976) : 409-411.

Huang, H.C. and Lee, C.Y. "Isolation and pharmacological properties of phospholipase A_2 from Vipera russelli (Russell's viper) snake venom" Toxicon 22(1984) : 207-217.

Huang, H.C. "Release of slow reacting substance from the guinea-pig lung by phospholipase A_2 of Vipera russellii snake venom" Toxicon 22(1984) : 359-372.

Ishwariah, V. and David, J.C. "Pharmacological Action of the venom of Russell's Viper" Indian J. Med. Res. 19(4),(1932) :1035-1040.

Iwanaga, S. and Suzuki, T. Enzymes in Snake Venom in Snake Venoms. (Lee, C.Y. ed) pp. 61-158. Springer-Verlag Berlin Heidelburg, New York, 1979.

Kleinman, A., Page, R.C. and Preisler, P.W. "Effect of prothrombin Clotting Time of the Concentrations of Calcium and other Salts" J. Lab. Clin. Med. 30(1945) : 448.

Kolmer, J.A., Spaulding, E.H. and Robinson, H.W. in Approved Laboratory Technique. pp. 66-69, Atteton-Century Crofts,Inc. New York, 1951.

Lee, C.Y. "Toxicological Studies on the Venom of Vipera russellii formosensis IV on the Cause of Death in Rabbits" Folia Pharmacol. Jap. 40(1944) : 53-54.

Lee, C.Y. "Toxicological Studies on the Venom of Vipera russellii formosensis maki" J.F.M.A. 47(1948) : 65-98.

Lee, C.Y.. Johnson, S.A. and Seegers, W.H. "Clotting of blood with Russell's Viper Venom" J. Mich. State Med. Soc. 54(1955) : 801-824.

Mandal, A.K., Haygood, C.C., Bell, R.D., Sethney, T., James, T.M., Nordquist, J.A., Yunice, A.A. and Lindeman, R.D. "Effects of Acute and Chronic Splenectomy on Experimental Acute renal Tubular Lesion" J. Lab. Clin. Med. 92(5),(1978) : 698-711.

Mandal, A.K. "The Spleen and Acute Renal Failure : Mechanisms of Renal Protection by Splenectomy. Involvement of Prostaglandins"

Prostaglandins Leukotrienes Med. 9(1982) : 85-107.

Oram, S., Ross, G., Pell, L. and Winteler, J. "Renal Cortical Calcification After Snake Bite" Br. Med. J. 1(1963) : 1647-1648.

Raab, W. and Kaiser, E. "Nephrotoxic Action of Snake Venom" Mem.Inst. Butantan 33(1966) : 1017-1020.

Ratcliffe, P.J. and S. Pukrittayakamee. "Direct nephrotoxicity of Russell's viper venom demonstrated in the isolated perfuged rat kidney" Toxicon 23(4),(1985) : 605.

Reid, H.A., Chan, K.E. and Thean, P.C. "Plasma Coagulation Defect (Defibrination Syndrome) in Malayan Viper Bite" Lancet 1(1963) : 621-626.

Roy,M.W.,Ott,C.E., Welch,W.J., Downs, J.H. and Kotchem,T.A. "Mechanism for inhibition of renin release by acute plasma volume expansion in the dog" Am. J. Physiol. 248(17),(1981) : F 206- F 211.

Ruddy, S., Gigli, I. and Austen, K.F. "The Complement System of Man (Fourth of Four Parts)" N. Engl. J. Med. 287(1972) :642-646.

Sant, S.M. and Purandare, N.M. "Autopsy of Cases of Snake Bite with Special Reference to Renal Lesion" J. Postgrad. 18(1972) : 181-188.

Sarangi, A., Patnaik, B.C., Das, G.C., Tripathy, N., Misra, G., Snain, A.K. and Das, G.K. "Renal Involvement in Viperine Snake Bite" Indian J. Med. Res. 71(1980) : 918-923.

Schreiner,G.E. and Maher, J.F. "Toxic Nephropathy" Am. J. Med. 38(1965) : 409.

Shastry, J.C., Date, A., Carman, R.H. and Johny, K.V. "Renal Failure Following Snake Bite" Am. J. Trop. Med. 26(3),(1977) : 1032-1038.

Shoukas, A.A., MacAnespie, C.L., Brunner, M.J. and Watermeier, L. "The Importance of the spleen in Blood Volume Shifts of the Systemic Vascular Bed Caused by the Carotid Sinus Barorecepter Reflex in the dog" Cire Res. 49(1981) : 759-767.

Sitprija, V. and Boonpucknavig, V. "Further observation of Renal Insufficiency in Snake Bite" Nephron 13(1974) : 396-403.

Sitprija, V. and Boonpucknavig, V. "The Kidney in Tropical Snakebite" Clin. Nephrology 8(3),(1977) : 377-383.

Sitprija, V. and Boonpucknavig, V. Snake Venoms and Nephrotoxicity, in Snake Venom (Lee, C.Y. ed) pp. 997-1018, Springer-Verlag Berlin Heidelburg, New York, 1979.

Smith, H.W. in Principle of Renal Physiology, pp. 196-217, Oxford University press, Inc, 1962.

Starling, E.H. and Lavatt, E.C. in Principles of Human Physiology, pp. 210, 13 th Churchill London, 1962.

Sullivan, S.M. and Johnson, P.C. "Effect of Oxygen on blood flow Autoregulation in cat Sartorius Muscle" Am. J. Physiol. 214(6),(1981) : H807-H815.

Tongvongchai, S. "Effects of Russell's Viper Venom on Renal Functions in Splenectomized Dogs" Master's Thesis, Department of Inter-Department of Physiology, Graduate School, Chulalongkorn University, 1984.

Trisnananda, M. "Incidence, Clinical Manifestrstion and General Management of Snake Bite" South Asian J. Trop.Med.Pub.HLH 10(2),(1979) : 248-254.

Tungthanathanich, P. "Effects of Russell's Viper Venom on Renal function in dogs" Master's Thesis,Department of Inter-Department of Physiology, Graduate School, Chulalongkorn

University, 1983.

Vander, A.J. "Effect of Catecholamines and the renal nerves on renin secretion in anesthetized dog" Am. J. Physiol. 209(3),(1965) : 659-662.

Vick, J.A., Ciucuta, H.P. and Menthei, J.H. Pathophysiological Studies of Ten Snake Venoms in Animal Toxin. (Russell,F.F. and Saunders, P.R. eds) pp. 269-282, Oxford Pergamon, 1967.

Werning, C., Vetter, W., Weidmann, P., Schweikert, H.U., Stiel, D., and Siegenthaler, W. "Effect of prostaglandin E_1 on renin in dog" Am. J. Physiol. 220(4),(1971) : 852-856.

Whitaker, A.N., McKay, D.G. and Csavossy, I."Studies on Catecholamine Shock I. Disseminated Intravascular coagulation" Am. J. Path. 56(1969) : 153-176.

Appendix

Table 1 The effects of intravenous injection of 0.1 mg/kg.bw.of Russell's viper venom on cardiovascular and renal parameters of dogs group I No. 1, weighing 15.0 kgs.

Parameter	Pre-volume expansion	post volume expansion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm/Hg.)	144.67	144.67	126.33	144.67	147.00	138.00
HR (beat/min)	234	228	246	246	246	246
CO (ml/min/kg.bw.)	114.80	214.20	108.53	-	104.00	-
PV (ml/kg.bw.)	32.00	40.00	42.67	-	48.73	-
BV (ml/kg.bw.)	51.67	56.00	64.67	-	73.80	-
PCV (%)	38	28	34	34	34	34
TPR (dyne-sec/cm^5)	99,397	54,018	93,098	-	113,049	-
RVR (dyne-sec/cm^5)	755,679	307,732	-	419,229	536,852	-
V (ul/min/kg.bw.)	12.67	130.67	0	53.33	16.67	33.33
RPF (ml/min/kg.bw.)	9.30	27.00	0	0	18.20	14.40
RBF (ml/min/kg.bw.)	15.10	37.60	0	0	27.60	21.90
GFR (ml/min/kg.bw.)	2.22	3.08	0	0	1.67	1.27
F.F. (%)	23.87	11.40	0	0	9.18	8.82
R.F. (%)	13.15	17.55	0	0	8.83	-
P_{Na} (mEq/L)	146	149	144	144	144	143
P_K (mEq/L)	4.4	4.1	3.9	3.9	4.0	3.8
P_{Cl} (mEq/L)	108	119	115	114	115	113
$U_{Na}V$ (uEq/min/kg.bw.)	2.36	19.21	0	2.19	1.82	2.70
U_K (uEq/min/kg.bw.)	1.60	5.36	0	7.67	3.78	2.40
$U_{Cl}V$ (uEq/min/kg.bw.)	1.10	19.21	0	3.41	1.12	1.00
F.E.of Na (%)	0.73	4.19	-	-	0.76	0.55
F.E.of K (%)	16.38	42.45	-	-	56.59	49.73
F.E.of Cl (%)	0.46	5.24	-	-	0.58	0.70
P_{Osn} (mOsm/kg.)	270.40	281.00	274.00	274.00	274.50	267.50
U_{Osm} (mOsm/kg.)	883	388	-	280	395	270
U_{Osm} (uOsm/min/kg.bw.)	11.19	50.70	0	14.93	18.43	9.00
C_{Osm} (uOsm/min/kg.bw.)	41.37	180.43	0	54.50	67.16	33.64
C_{H_2O} (uOsm/min/kg.bw.)	-28.70	-49.76	0	-1.17	-20.49	-0.31

Table 2 The effects of intravenous injection of 0.1 mg/kg.bw. of Russell's viper venom on cardiovascular and renal parameters of dogs group I No. 2,weighing 11.5 kgs.

Parameter	Pre-volume expansion	post volume expansion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm/Hg.)	153.00	158.67	137.33	156.47	143.67	131.33
HR (beat/min)	180	192	204	204	204	216
CO (ml/min/kg.bw.)	111.56	166.32	87.72	-	88.76	-
PV (ml/kg.bw.)	27.81	46.82	53.70	-	130.56	-
BV (ml/kg.bw.)	41.50	60.80	71.61	-	178.84	-
PCV (%)	33	23	25	27	27	27
TPR (dyne-sec/cm^5)	109,689	76,301	125,213	-	129,458	-
RVR (dyne-sec/cm^5)	477,875	678,198	984,198	211,079	429,351	473,495
V (ul/min/kg.bw.)	32.17	52.17	11.50	17.39	6.35	19.13
RPF (ml/min/kg.bw.)	17.16	14.40	0.84	43.08	19.54	8.78
RBF (ml/min/kg.bw.)	25.61	18.70	1.12	59.29	26.76	12.03
GFR (ml/min/kg.bw.)	5.28	3.04	0.31	1.72	1.42	1.80
F.F. (%)	30.77	21.11	36.90	3.99	7.27	20.50
R.F. (%)	22.96	11.24	1.28	-	30.15	-
P_{Na}(mEq/L)	145	144	143	144	144	144
P_K (mEq/L)	3.30	3.40	3.40	3.40	3.10	3.20
P_{Cl} (mEq/L)	116	126	115	130	122	123
$U_{Na}V$ (uEq/min/kg.bw.)	5.79	10.69	2.37	0.40	1.12	3.98
U_KV (uEq/min/kg.bw.)	4.44	3.76	0.83	3.10	1.05	2.45
$U_{Cl}V$ (uEq/min/kg.bw)	5.69	10.38	2.96	0.42	0.39	1.51
F.E. of Na (%)	0.76	2.44	5.35	0.16	0.55	1.55
F.E. of K (%)	25.48	36.38	78.75	53.01	23.85	42.53
F.E. of Cl (%)	0.93	2.71	8.30	0.19	0.23	0.68
P_{osm}(mOsm/kg)	274.50	261.70	257.30	265.00	270.00	283.70
U_{osm}(mOsm/kg.)	1582.50	913.20	1060.40	896.20	1211.00	1570.00
$U_{osm}V$ (uOsm/min/kg.bw.)	50.91	47.64	12.19	15.58	7.69	30.03
C_{osm} (uOsm/min/kg.bw.)	185.46	182.05	47.39	58.81	28.48	105.87
C_{H_2O}(uOsm/min/kg.bw.)	-153.29	-129.29	-35.89	-41.42	-22.13	-86.74

Table 3 The effects of intravenous injection of 0.1 mg/kg.bw. of Russell's viper venom on cardiovascular and renal parameter of dogs group I. No. 3 weighing 14.7 kgs.

Parameter	Pre-volume expansion	post volume expansion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm.Hg.)	112.33	134.00	118.33	128.67	130.67	124.67
HR (beat/min)	150	162	162	132	120	168
CO (ml/min/kg.bw.)	185.28	270.06	142.80	-	104.84	-
PV (ml/kg.bw.)	56.32	80.62	117.23	-	40.44	-
BV (ml/kg.bw.)	80.46	108.94	172.41	-	58.61	-
PCV (%)	30	26	32	32	31	30
TPR (dyne-sec/cm^5)	48,229	39,685	66,275	-	99,685	-
RVR (dyne-sec/cm^5)	1,316,745	257,479	569,299	691,694	785,316	989,295
V (ul/min/kg.bw.)	29.93	435.37	87.07	157.82	131.97	106.12
RPF (ml/min/kg.bw.)	14.78	30.80	11.30	10.12	9.18	7.06
RBF (ml/min/kg.bw.)	21.11	41.62	16.62	14.88	13.31	10.08
GFR (ml/min/kg.bw.)	2.62	2.61	2.59	2.96	2.30	1.13
F.F. (%)	17.72	8.47	22.92	29.25	25.05	16.01
R.F. (%)	3.66	15.41	11.64	-	12.70	-
P_{Na} (mEq/L)	141	142	142	142	145	146
P_K (mEq/L)	3.2	3.0	3.0	3.0	3.4	3.4
P_{Cl} (mEq/L)	120	122	122	128	131	130
$U_{Na}V$ (uEq/min/kg.bw.)	6.08	28.30	7.31	4.42	3.30	4.03
U_KV (uEq/min/kg.bw.)	2.18	3.40	3.57	1.74	1.98	1.27
$U_{Cl}V$ (uEq/min/kg.bw.)	7.57	31.40	5.83	3.79	3.30	2.33
F.E. of Na (%)	1.65	7.64	1.99	1.05	0.99	2.44
F.E. of K (%)	26.00	43.42	45.95	19.59	25.32	63.51
F.E. of Cl (%)	2.41	9.85	1.85	1.00	1.10	1.59
P_{osm} (mOsm/kg.)	296	296	295	298	298	306
U_{osm} (mOsm/kg.)	1,040	176	374	137	177	162
$U_{osm}V$ (uOsm/min/kg.bw.)	31.13	76.63	32.56	21.62	23.36	17.19
C_{osm} (uOsm/min/kg.bw.)	105.16	263.32	110.39	72.55	78.38	56.18
C_{H_2O} (uOsm/min/kg.bw.)	-75.23	+172.05	-23.32	+85.44	+53.59	+49.94

Table 4 The effects of intravenous injection of 0.1 mg/kg.bw. of Russell's viper venom on cardiovascular and renal parameter of dogs group 1 No.4. weighing 16.0 kgs.

Parameter	Pre-volume expansion	post volume expansion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm.Hg)	108.67	139.67	173.33	101.33	128.00	137.67
HR (beat/min)	168	192	174	174	186	204
CO (ml/min/kg.bw.)	369.66	329.61	102.22	-	148.26	-
PV (ml/kg.bw.)	72.78	87.49	92.58	-	72.51	-
BV (ml/kg.bw.)	88.76	101.74	118.69	-	88.43	-
PCV (%)	18	14	22	20	18	20
TPR (dyne-sec/cm^5)	23,512	33,891	57,376	-	69,051	-
RVR (dyne-sec/cm^5)	386,114	540,436	-	592,425	1,251,521	4,033,273
V (ul/min/kg.bw.)	25.00	88.75	0	27.50	13.75	20.63
RPF (ml/min/kg.bw.)	18.46	17.73	0	10.94	6.76	2.18
RBF (ml/min/kg.bw.)	22.51	20.67	0	13.68	8.18	2.73
GFR (ml/min/kg.bw.)	5.06	4.59	0	1.58	1.00	1.44
F.F.(%)	27.41	25.82	0	14.44	14.79	66.06
R.F.(%)	6.09	6.27	0	-	5.52	-
P_{Na} (mEq/L)	135	142	136	141	138	142
P_K (mEq/L)	2.9	3.1	3.1	2.7	2.5	3.4
P_{Cl} (mEq/L)	107	113	121	123	132	131
$U_{Na}V$(uEq/min/kg.bw.)	5.10	2.31	0	0.63	0.32	4.17
U_KV (uEq/min/kg.bw.)	1.73	3.91	0	1.29	1.00	1.34
$U_{Cl}V$(uEq/min/kg.bw.)	6.13	1.69	0	0.55	0.15	1.11
F.E. of Na (%)	0.75	0.35	-	0.28	0.23	2.04
F.E. of K (%)	11.79	27.48	-	30.24	40.00	27.37
F.E. of Cl (%)	1.13	0.33	-	0.28	0.11	0.59
P_{Osm}(mOsm/kg.)	286	305	296	312	297	305
U_{Osm}(mOsm/kg.)	1,415	460	-	422	427	878
$U_{Osm}V$ (uOsm/min/kg.bw.)	35.38	40.83	-	11.61	5.87	18.11
C_{Osm}(uOsm/min/kg.bw.)	123.69	133.85	-	37.20	19.77	59.39
C_{H_2O}(uOsm/min/kg.bw.)	-98.69	-45.10	-	-9.7	-6.02	-38.76

Table 5 The effects of intravenous injection of 0.1 mg/kg.bw. of Russell's viper venom on cardiovascular and renal parameter of dogs group I No. 5. weighing 12.5 kgs.

Parameter	Pre-volume expansion	post-volume expansion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm.Hg.)	127.33	136.50	105.00	113.00	119.33	129.33
HR (beat/min)	162	194	176	176	187	203
CO (ml/min/kg.bw.)	188.28	272.06	145.80	-	105.44	-
PV (ml/kg.bw.)	58.84	78.62	115.00	-	40.33	-
BV (ml/kg.bw.)	77.42	99.52	147.44	-	51.71	-
PCV (%)	24	21	22	22	22	22
TPR (dyne-sec/cm^5)	48,269	38,680	63,275	-	89,658	-
RVR (dyne-sec/cm^5)	1,304,743	254,779	562,929	681,649	783,516	982,995
V (ul/min/kg.bw.)	29.93	205.39	45.97	71.59	65.32	56.93
RPF (ml/min/kg.bw.)	12.94	21.41	4.10	13.00	11.66	6.08
RBF (ml/min/kg.bw.)	17.03	27.10	5.26	16.67	14.95	7.79
GFR (ml/min/kg.bw.)	3.66	3.06	1.02	1.82	1.80	1.45
F.F. (%)	37.66	32.11	32.22	31.17	33.33	41.40
R.F. (%)	10.70	11.10	4.22	-	12.00	-
P_{Na} (mEq/L)	141	142	142	142	144	145
P_K (mEq/L)	3.2	3.0	3.0	3.4	3.4	3.4
P_{Cl} (mEq/L)	120	122	122	127	130	130
$U_{Na}V$ (uEq/min/kg.bw.)	6.25	28.42	7.60	4.34	3.08	4.23
U_KV (uEq/min/kg.bw.)	2.20	3.45	3.60	1.81	2.08	1.30
$U_{Cl}V$ (uEq/min/kg.bw.)	7.60	32.35	5.83	3.80	3.30	2.88
F.E. of Na (%)	1.21	6.54	5.25	1.87	1.19	2.01
F.E. of K (%)	18.78	37.58	117.65	33.15	33.99	26.37
F.E. of Cl (%)	1.73	8.67	4.68	1.64	1.41	1.53
P_{Osm} (mOsm/kg.)	290	290	296	296	296	300
U_{Osm} (mOsm/kg.)	1,020	180	380	150	180	168
$U_{Osm}V$ (uOsm/min/kg.bw.)	30.52	36.97	17.47	10.74	11.76	9.56
C_{Osm} (uOsm/min/kg.bw.)	105.24	127.48	59.22	36.28	39.72	31.87
C_{H_2O} (uOsm/min/kg.bw.)	-75.47	-77.91	-13.25	+35.31	+25.60	+25.06

Table 6 The effects of intravenous injection of 0.1 mg/kg.bw.of Russell's viper venom on cardiovascular and renal parameter of dogs group I No.6 weighing 12.5 kgs.

Parameter	Pre-volume expansion	post volume expansion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm.Hg.)	114.20	136.00	120.23	130.50	132.67	128.00
HR (beat/min)	150	165	162	130	120	165
CO (ml/mim/kg.bw.)	185.82	268.33	141.95	-	105.00	-
PV (ml/kg.bw.)	55.20	80.00	115.23	-	41.10	-
BV (ml/kg.bw.)	78.86	106.67	167.00	-	58.71	-
PCV (%)	30	25	31	31	30	30
TPR (dyne-sec/cm^5)	49,154	40,537	67,798	-	101,057	-
RVR (dyne-sec/cm^5)	1,345,172	265,041	592,976	712,936	825,112	1,023,744
V (ul/min/kg.bw.)	29.90	434.59	86.85	157.00	132.00	105.95
RPF (ml/min/kg.bw.)	14.75	30.78	11.20	10.10	9.00	7.00
RBF (ml/min/kg.bw.)	21.07	41.04	16.23	14.64	12.86	10.00
GFR (ml/min/kg.bw.)	2.60	2.59	2.56	2.91	2.25	1.15
F.F. (%)	17.63	8.41	22.86	28.81	25.00	16.43
R.F. (%)	3.64	15.29	11.43	-	12.25	-
P_{Na} (mEq/L)	142	142	142	143	145	146
P_K (mEq/L)	3.2	3.1	3.2	3.1	3.3	3.3
P_{Cl} (mEq/L)	122	122	123	128	130	130
$U_{Na}V$(uEq/min/kg.bw.)	5.98	26.07	6.95	3.93	3.30	3.71
U_KV (uEq/min/kg.bw.)	2.09	3.48	3.47	1.57	1.98	1.06
$U_{Cl}V$(uEq/min/kg.bw.)	7.48	31.29	5.65	3.77	3.17	4.24
F.E. of Na (%)	1.62	7.09	1.91	0.94	1.01	1.06
F.E. of K (%)	25.12	43.34	42.36	17.40	26.67	27.93
F.E. of Cl (%)	2.36	9.90	1.79	0.57	1.08	2.84
P_{Osm}(mOsm/kg.)	295	295	295	298	298	300
U_{Osm}(mOsm/kg)	1,000	180	380	140	180	155
$U_{Osm}V$(uOsm/min/kg.bw.)	29.90	78.23	33.00	18.48	23.76	16.42
C_{Osm}(uOsm/min/kg.bw.)	101.36	265.17	111.87	73.76	79.73	54.74
C_{H_2O}(uOsm/min/kg.bw.)	-71.46	+169.42	-25.02	+83.24	+52.27	+51.21

Table 7 The effects of intravenous injection of 0.05 mg/kg.bw.of Russell's viper venom on cardiovascular and renal parameters of dogs group II No. 1, weighing 19.5 kgs.

Parameter	Pre-occlusion	post occlusion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm.Hg.)	110	108	59	35	43	39
HR (beat/min)	216	228	234	192	228	216
CO (ml/min/kg.bw.)	112.59	78.82	56.21	-	92.77	-
PV (ml/kg.bw.)	47.17	27.44	7.52	-	33.64	-
BV (ml/kg.bw.)	84.23	41.58	10.90	-	48.77	-
PCV (%)	46	34	31	31	31	31
TPR (dyne-sec/cm^5)	78,140	109,589	83,950	-	37,072	-
RVR (dyne-sec/cm^5)	723,503	3,052,240	-	12,724,091	79,980,000	155,961,000
V (ul/min/kg.bw.)	12.82	5.13	0	1.23	0.75	1.23
RPF (ml/min/kg.bw.)	6.80	1.87	0	0.15	0.03	0.04
RBF (ml/min/kg.bw.)	12.16	2.83	0	0.22	0.04	0.06
GFR (ml/min/kg.bw.)	3.3	0.47	0	0.10	0.00	0.02
F.F. (%)	48.53	25.13	0	66.67	0.00	50.00
R.F. (%)	10.80	3.59	0	-	0.04	-
P_{Na}(mEq/L)	158	144	144	147	154	148
P_K(mEq/L)	3.8	3.1	3.1	3.5	3.6	4.0
P_{Cl}(mEq/L)	104	124	127	126	127	131
$U_{Na}V$(uEq/min/kg.bw.)	0.82	0.17	-	0.06	0.00	0.00
U_KV(uEq/min/kg.bw.)	1.94	0.34	-	0.05	0.00	0.05
$U_{Cl}V$(uEq/min/kg.bw.)	0.36	0.11	-	0.05	0.03	0.04
F.E.of Na (%)	0.16	0.04	0	0.41	0.65	0.00
F.E. of K (%)	15.47	23.34	0	0.14	0.00	0.63
F.E. of Cl (%)	0.10	0.19	0	0.40	0.79	1.53
P_{Osm} (mOsm/kg.)	312	312	308	310	310	319
U_{Osm} (mOsm/kg.)	799	636	-	634	-	-
$U_{Osm}V$(uOsm/min/kg.bw.)	10.24	3.26	-	0.78	-	-
C_{Osm}(uOsm/min/kg.bw.)	32.83	10.46	0	2.52	-	-
C_{H_2O}(uOsm/min/kg.bw.)	-20.01	-5.33	0	-1.29	-	-

Table 8 The effects of intravenous injection of 0.05 mg/kg.bw.of Russell's viper venom on cardiovascular and renal parameter of dog group II No.2, weighing 17.0 kgs.

Parameter	Pre-occlusion	post occlusion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm.Hg.)	85	108	36	45	51	41
HR (beat/min)	150	198	198	180	186	186
CO (ml/min/kg.bw.)	140.85	115.98	39.12	-	41.02	-
PV (ml/min/kg.bw.)	41.36	62.48	38.12	-	41.00	-
BV (ml/min/kg.bw.)	75.16	102.42	57.75	-	62.12	-
PCV (%)	45	39	34	34	34	33
TPR (dyne-sec/cm^5)	48,266	74,477	73,601	-	99,439	-
RVR (dyne-sec/cm^5)	638,338	491,345	-	5,141,571	1,933,166	6,976,979
V (ul/min/kg.bw.)	42.94	28,24	0	1.18	2.35	2.18
RPF (ml/min/kg.bw.)	5.86	10.73	0	0.47	1.39	0.32
GFR (ml/min/kg.bw.)	3.02	3.33	0	0.24	0.63	0.24
F.F. (%)	51.54	31.03	0	51.00	45.32	75.00
R.F. (%)	7.56	15.16	0	-	1.54	-
P_{Na}(mEq/L)	146	143	142	141	144	149
P_K(mEq/L)	3.1	3.4	3.3	3.2	3.1	3.2
P_{Cl}(mEq/L)	104	108	108	108	110	118
$U_{Na}V$ (uEq/min/kg.bw.)	8.24	3.70	-	0.04	0.04	0.04
U_KV (uEq/min/kg.bw.)	1.29	1.21	-	0.10	0.20	0.18
$U_{Cl}V$ (uEq/min/kg.bw.)	3.69	1.55	-	0.02	0.03	0.03
F.E. of Na (%)	1.87	0.78	-	0.03	0.04	0.08
F.E. of K (%)	13.78	10.69	-	3.72	10.24	23.44
F.E. of Cl (%)	1.17	0.43	-	0.02	0.04	0.11
P_{osm}(mOsm/kg)	304	304	304	308	310	306
U_{Osm} (mOsm/kg)	492	660	-	574	437	416
$U_{Osm}V$(uOsm/min/kg.bw.)	21.13	18.64	-	0.68	1.03	0.91
C_{Osm}(uOsm/min/kg.bw.)	69.49	61.31	-	2.20	3.31	2.96
C_{H_2O}(uOsm/min/kg.bw.)	-26.55	-33.07	-	-1.02	-0.96	-0.78

Table 9 The effects of intravenous injection of 0.05 mg/kg.bw. of Russell's viper venom on cardiovascular and renal parameter of dog group II No. 3 weighing 15.5 kgs.

Parameter	Pre-occlusion	post occlusion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm.Hg.)	152	132	59	76	74	68
HR (beat/min)	192	216	186	198	186	186
CO (ml/min/kg.bw.)	105.76	122.33	70.46	-	80.08	-
PV (ml/kg.bw.)	49.75	67.90	46.90	-	66.17	-
BV (ml/kg.bw.)	76.55	95.63	66.06	-	95.89	-
PCV (%)	35	29	29	29	31	31
TPR (dyne-sec/cm^5)	114,949	86,302	66,972	-	73,908	-
RVR (dyne-sec/cm^5)	874,601	499,638	699,084	565,440	747,288	1,273,686
V (ul/minkg.bw.)	25.81	14.19	3.87	14.19	10.32	5.81
RPF (ml/min/kg.bw.)	9.04	15.00	4.79	7.63	5.46	2.95
RBF (ml/min/kg.bw.)	13.90	21.13	6.75	10.75	7.92	4.27
GFR (ml/min/kg.bw.)	1.75	1.02	0.36	0.69	0.63	0.38
F.F. (%)	19.14	6.80	7.52	9.04	11.54	12.88
R.F. (%)	13.14	17.27	9.58	-	11.97	-
P_{Na}(mEq/L)	150	151	149	150	147	149
P_K(mEq/L)	4.1	4.2	4.0	3.4	3.6	3.7
P_{Cl}(mEq/L)	116	119	123	121	114	119
$U_{Na}V$ (uEq/min/kg.bw.)	6.14	0.77	-	0.65	0.34	0.28
U_KV (uEq/min/kg.bw.)	2.09	1.21	-	1.16	1.03	0.56
$U_{Cl}V$ (uEq/min/kg.bw.)	3.48	0.48	-	0.18	0.11	0.07
F.F. of Na (%)	2.34	0.50	-	0.63	0.37	0.49
F.F. of K (%)	29.13	28.24	-	49.45	45.41	39.83
F.F. of Cl (%)	1.71	0.40	-	0.22	0.15	0.15
P_{Osm}(mOsm/kg.)	297	298	303	303	304	304
U_{Osm}(mOsm/kg.)	1370	818	-	514	536	560
$U_{Osm}V$ (uOsm/min/kg.bw.)	35.36	11.6	-	7.29	5.53	3.25
C_{Osm}(uOsm/min/kg.bw.)	119.06	38.95	-	24.07	18.20	10.70
C_{H_2O}(uOsm/min/kg.bw.)	-93.25	-24.76	-	-9.88	-7.88	-4.89

Table 10 The effects of intravenous injection of 0.05 mg/kg.bw. of Russell's viper venom on cardiovascular and renal parameter of dog group II No. 4 weighing 14.o kgs.

Parameter	Pre-Occlusion	post occlusion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm.Hg)	126	53	31	29	25	-
HR (beat/min)	168	156	162	162	102	-
CO (ml/min/kg.bw.)	150.08	54.83	61.64	-	45.49	-
PV (ml/kg.bw.)	52.74	55.83	55.17	-	36.24	-
BV (ml/kg.bw.)	73.26	71.57	66.47	-	42.14	-
PCV (%)	28	22	17	17	14	-
TPR (dyne-sec/cm^5)	67,147	77,311	40,224	-	43,955	-
RVR (dyne-sec/cm^5)	674,982	5,887,417	-	41,418,214	-	-
V (ul/min/kg.bw.)	20.71	3.43	0	0.43	0	-
RPF (ml/min/kg.bw.)	10.75	0.56	0	0.05	0	-
RBF (ml/min/kg.bw.)	14.93	0.72	0	0.06	0	-
GFR (ml/min/kg.bw.)	1.80	0.18	0	0.01	0	-
F.F. (%)	16.74	32.14	0	20	0	-
R.F. (%)	9.95	1.31	0	0	0	-
P_{Na}(mEq/L)	140	140	144	143	145	-
P_K(mEq/L)	4.4	3.6	3.9	4.0	4.5	-
P_{Cl}(mEq/L)	110	115	114	114	113	-
$U_{Na}V$ (uEq/min/kg.bw.)	-	0.22	-	-	-	-
U_KV (uEq/min/kg.bw.)	1.37	0.13	-	-	-	-
$U_{Cl}V$ (uEq/min/kg.bw.)	3.81	0.15	-	-	-	-
F.E. of Na (%)	-	0.87	-	-	-	-
F.E. of K (%)	17.30	20.06	-	-	-	-
F.E. of Cl (%)	1.92	0.72	-	-	-	-
P_{Osm}(mOsm/kg.)	299	295	307	307	314	-
U_{Osm}(mOsm/kg.)	1050	-	-	-	-	-
$U_{Osm}V$ (uOsm/min/kg.bw.)	21.75	-	-	-	-	-
C_{Osm}(uOsm/min/kg.bw.)	72.73	-	-	-	-	-
C_{H_2O}(uOsm/min/kg.bw.)	-52.02	-	-	-	-	-

Table 11 The effects of intravenous injection of 0.05 mg/kg.bw. of Russell's viper venom on cardiovascular and renal parameters of dog group II No. 5 weighing 10.0 kgs.

Parameter	Pre-occlusion	Post occlusion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm.Hg.)	131	66	33	33	28	16
HR (beat/min)	198	234	198	204	210	150
CO (ml/min/kg.bw.)	154.96	98.71	73.01	-	67.13	-
PV (ml/kg.bw.)	53.84	33.28	40.53	-	49.19	-
BV (ml/kg.bw.)	94.40	45.59	51.30	-	56.48	-
PCV (%)	43	27	21	21	20	18
TPR (dyne-sec/cm^5)	67,613	53,477	36,150	-	33,360	-
RVR (dyne-sec/cm^5)	828,251	4,933,346	11,933,346	7,540,971	55,986,000	-
V (ul/min/kg.bw.)	15.00	5.00	0.93	2.15	0.24	-
RPF (ml/min/kg.bw.)	7.21	1.07	0.17	0.28	0.03	0
RBF (ml/min/kg.bw.)	12.65	0.79	0.22	0.35	0.04	0
GPR (ml/min/kg.bw.)	1.34	0.33	0.06	0.01	0.01	0
F.F. (%)	18.59	30.84	35.29	3.57	33.33	-
R.F. (%)	8.16	0.80	0.30	-	0.06	-
P_{Na} (mEq/L)	144	147	144	150	149	151
P_K (mEq/L)	3.4	3.3	4.1	4.1	4.3	6.0
P_{Cl} (mEq/L)	125	117	118	120	125	121
$U_{Na}V$ (uEq/min/kg.bw.)	0.72	0.72	0.13	-	-	-
U_KV (uEq/min/kg.bw.)	1.74	1.74	0.35	-	-	-
$U_{Cl}V$ (uEq/minkg.bw.)	0.20	0.20	0.10	-	-	-
F.E. of Na (%)	0.34	0.27	-	-	-	-
F.E. of K (%)	38.19	32.14	-	-	-	-
F.E. of Cl (%)	0.12	0.26	-	-	-	-
P_{Osm} (mOsm/kg)	304	301	304	306	313	313
U_{Osm} (mOsm/kg)	588	459	-	-	-	-
$U_{Osm}V$ (uOsm/min/kg.bw.)	8.82	2.30	-	-	-	-
C_{Osm} (uOsm/min/kg.bw.)	29.01	7.62	-	-	-	-
C_{H_2O} (uOsm/min/kg.bw.)	-14.10	-2.62	-	-	-	-

Table 12 The effects of intravenous injection of 0.05 mg/kg.bw. of Russell's viper venom on cardiovascular and renal parameters of dog group II No. 6, weighing 14.0 kgs.

Parameter	Pre-occlusion	post occlusion + venom injection				
		0 min	15 min	30 min	60 min	120 min
MAP (mm.Hg.)	93	116	27	35	28	47
HR (beat/min)	144	198	192	186	174	186
CO (ml/min/kg.bw.)	100.06	165.86	58.66	-	57.76	-
PV (ml/kg.bw.)	49.47	47.94	43.36	-	33.84	-
BV (ml/kg.bw.)	76.11	73.75	60.23	-	47.01	-
PCV (%)	35	35	28	28	28	28
TPR (dyne-sec/cm^5)	74,337	55,937	36,813	-	38,771	-
RVR (dyne-sec/cm^5)	736,450	1,354,406	-	69,982,500	20,358,545	16,343,739
V (ul/min/kg.bw.)	56.43	54.29	0	0.41	0.84	2.00
RPF (ml/min/kg.bw.)	6.57	4.46	0	0.03	0.08	0.17
RBF (ml/min/kg.bw.)	10.10	6.85	0	0.04	0.11	0.23
GFR (ml/min/kg.bw.)	2.65	3.00	0	0.00	0.04	0.08
F.F. (%)	40.33	67.26	0	0	50	47.05
R.F. (%)	10.09	4.13	0	-	0.19	-
P_{Na}(mEq/L)	145	143	140	143	139	138
P_K(mEq/L)	3.2	2.9	3.5	3.0	2.2	2.5
P_{Cl}(mEq/L)	113	114	118	119	114	124
$U_{Na}V$ (uEq/min/kg.bw.)	7.90	4.40	-	-	-	-
U_KV (uEq/min/kg.bw.)	1.92	2.33	-	-	-	-
$U_{Cl}V$ (uEq/min/kg.bw.)	5.59	2.55	-	-	-	-
F.E. of Na (%)	2.06	1.03	-	-	-	-
F.E. of K (%)	22.64	26.78	-	-	-	-
F.E. of Cl (%)	1.87	0.75	-	-	-	-
P_{Osm}(mOsm/kg.)	307	284	294	301	383	330
U_{Osm}(mOsm/kg.)	470	456	-	-	-	-
$U_{Osm}V$(uOsm/min/kg.bw.)	26.52	24.76	-	-	-	-
C_{Osm}(uOsm/min/kg.bw.)	86.39	87.17	-	-	-	-
C_{H_2O}(uOsm/min/kg.bw.)	-29.96	-32.88	-	-	-	-

BIOGRAPHY

Mr.Tianchai Chaiyasest was born on April, 23, 1949 in Naradhivas and graduated with B.Sc.(Med.Tech.) in 1971. He is an instructor in Department of Medical Technology, Faculty of Medicine, Chulalongkorn University.