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## Venom Composition in Rattlesnakes: Trends and Biological Significance

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<sup>&</sup>lt;sup>2</sup> - : . k .

<sup>⊦ 2008</sup> E E T

Table 1.		k					
Component Name	Approximate Mass (kDa) Function			Biological Activity		References	
Enzymes							
Liizyiikts	94-140	Н		-	; ;	MA , 1998; V , 2002	
5'_	53-82	н	5'-		/ K(?)	1008. ▲ 2002	
A k	90-110	H	5	N		, 1998 <sup>V</sup> , 1998 <sup>V</sup>	
Н	73	Н		-		T , 2001	
r.	85-150	L.			,	Т, 1998	
		Ľ_					
S : 12 -							
- V	48-85	Н		Н	, ,	, 2005 S	
-'	43-60		,			5	
_	20-24		, .				
S <sub>T</sub> - k	31-36					; k ,1998; M k S2005	
k - k	27-34	H MW k	k ;		;	k M , 2000 N <sub>1998</sub> , 2000	
A	25-36	101 00		_	;		
V .	10.15	2.		J	(?)	S <sub>1985</sub>	
$\mathbf{V}^{\mathbf{A}_2}$	13-15	2-	3	M	, ,	, 1997, 2003	
Non-enzymatic protein	s/peptides						
-	21-29		k T -		;	v k	
( s )/			IN		. (?)	й , 2004 М	
<b>A</b> <sub>2</sub> -	24	k			•	<b>▲</b> ., 1985;	
LV <sup>2</sup> (2	,					V ., 1988	
) -	27-29			V V	, -	., 1994 , 1998 E	
	5.2-15				;	., 2005	
	4-5.3	_	-	_	, ;	, 1975;	
$M_{\Lambda^2}$		M	;	M	· · · · · ·	L ., 1979;	
Smaller nentides		1				, 1997 N	
k -	1.0-1.5			:	· · ·	W	
Т	0 43-0 4	k				** 2005	
-				S		1993; k k <sup>M</sup> , 2005	
Smaller organic compo	bunds $-0.3$	17		н		IVI ▲ 2002-2004	
(A, H,	VM = 0.5	τ/	(?)	11	, (?);	V , 2002, 2004	
v 1v1 )	0.192			S		., 1992; ., 1992	
k (k )	). N	-		,	,		

 $M = \begin{pmatrix} k & (k ), \\ k & k \end{pmatrix} = \begin{pmatrix} k & k \\ k & k \end{pmatrix}$   $/ \qquad . \qquad S \qquad k \qquad . (?)$ 

Iable 2.18		X							
Species	Thr (nmol/min/mg)	Kal (nmol/min/mg)	MPr (ΔA342 nm/ min/mg)	PLA <sub>2</sub> (nmol/min/mg)	PDE (ΔA400 nm/ min/mg)	LAAO (nmol/min/mg)	Toxicity (Mouse LD <sub>50</sub> , µg/g)	General Locality	
<b>Crotalus</b> C adamanteus	1012.2	90.4	0 333	22.60	1 36	L 04	0 0		
C. atrox	671.9	7.006	1.341	18.01	1.04	31.8			
C. basiliscus	898.1	937.6	2.522	52.37	0.82	23.0	2.8	· ·	
C. durissus terrificus	211.0	796.4	0.071	5.80	1.55	4.0	0.13	SWIM	
C. (durissus) tzabcan	972.9	145.4	1.496	20.71	1.34	69.4	2.5		
C. enyo enyo	764.5	69.0	0.825	33.65	0.71	37.6	2.8	Г М	τ
C. horridus (atricauda	tus) 897.4	221.9	0.285	42.66	0.36	24.9	1.0	M k	S
C. horridus horridus	1073.4	849.1	1.315	27.84	2.10	70.8	3.0	V k	
C. lepidus lepidus	971.7	1032.6	1.070	61.50	0.38	65.2		M Y.	
C. lepidus klauberi	1194.4	983.4	1.320	79.30	0.45	61.9	1.55	∧ : ∧ ▼	
C. mitchelli pyrrhus	315.9	781.6	1.242	21.79	1.31	22.4	2.5		
C. molussus molossus	657.3	602.5	0.924	13.11	0.36	26.4	2.7		
C. oreganus oreganus	981.7	1034.1	1.572	15.05	0.62	34.3	2.8	  >	
C. oreganus concolor	621.6	621.8	0.135	29.27	0.69	34.4	0.46		
C. oreganus helleri	847.4	551.8	1.460	22.76	0.39	43.2	1.5	<b>√</b> ∧	
C. polystictus	985.4	841.5	1.379	27.15	0.64	7.8	3.4	> 	
C. pricei pricei	1267.4	1226.8	1.180	70.10	0.05	33.8	1.25		
C. pusillus	90.9	918.7	1.575	24.70	0.74	12.2			
C. ruber ruber	670.9	919.8	2.263	5.40	0.29	50.2	3.8	IMI MI.	
C. scutulatus scutulatu	s 860.9	781.8	0.021	36.76	1.04	49.2	0.2		
C. tigris	968.4	18.9	0.052	28.77	0.16	1.95	0.07		
C. viridis viridis	981.4	971.8	0.900	41.30	0.60	49.2	1.8		
Average	853.9	695.4	1.06	31.84	0.77	36.5	2.0	8	
1 SE	252.3	359.9	0.69	19.5	0.51	20.5	1.2		
Sistrurus									
S. catenatus catenatus	593.9	428.5	0.21	41.7	0.134	62.1	0.9		
S. catenatus edwardsii	396.3	533.4	1.32	14.9	0.257	88.5	1.35		
S. catenatus tergeminu	s 642.8	537.7	1.02	16.1	0.137	86.9	2.6	۔۔	
S. miliarius barbouri	676.4	253	1.1	38.8	0.078	56.0	4.5		
Crotalus (Sistrurus) ra	T.999.7	1000	0.853	31.2	0.063	19.7	3.2		
Average	661.8	550.5	0.901	28.5	0.134	62.6	2.51	IM	
1 SE	97.4	123.7	0.19	5.6	0.034	12.5	0.65		
	- k (T ), I	k k - k ( ),		Ļ	),	$(\underline{A}_2, (\underline{A}_2), \underline{A}_2),$		( 🖥 ), – –	
EVV ta).				Μ		V LV		L	

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Table 2.12





β-C. enyo, C. l. klauberi, C. pricei, S. c. edwardsii; ., 1987, 1990), ( () k, C. d. terrificus). T **ب** 14 k , (C. lepidus: 1992; C. o. helleri: ., 2004), W ., 2001), A C. enyo, k, M. l. klauberi, C. pricei, C. tzabcan, S. c. edwardsii. concolor *C. o*. . H ( . 3). Enzyme assays. ., 1988), ( 14 2), . T Т - k C. d. terrificus C. pricei- k  $(r^2 = 0.65; P = 0.005)$ C. pricei k C. tigris . 5). H М C. basiliscus C.С.  $\mathbf{v}^{\mathbf{A}_2}$ tigris l. klauberi 0.15 (P C. ruber C. h. horridus = 0.55) 19 0.82 (P = 0.04)C. (Sistrurus) ravus N S. c. edwardsii ). ( C. tigris . T Occurrence of type I and type II venoms and phylogeny. T ), k (2006;( k . 6). Toxicity. *C*. *l*. (..., C. mitchellii, C. oreganus, C. scutulatus) 50  $L_{S. c. tergeminus}^{50}$ klauberi, C. pricei,  $(\ldots, C. durissus$ ), (Sistrurus) NSV 2).<sub>V</sub> (T 1.0 1-5 50 <sup>L</sup>4). A Ē



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$$1.0\mu$$
 / ,  $T$  ,  $K_{MT}$  k , 2003), T , /  
T  
k  $M_{T}$  k , 2003), T , /  
J ( ),  $K_{T}$  k , 2003),  
M  $K_{C,d,terrificus, C, C}$  , 2003),  
M  $C, d, terrificus, C, C, c \ concolor, C, \$ 

 $\mathbb{B}_{1} \stackrel{*}{\longrightarrow} \stackrel{\bullet^{*}}{\longrightarrow} M. A., J. L. G , C \stackrel{*}{\longrightarrow} \stackrel{*}{\longrightarrow} \frac{*}{1000}$ C. L. . T 26:665-673. k  $\mathbb{B}^{k}$ , ., C.  $\mathbb{B}_{1}$ , A.  $\mathbb{V}_{1}^{*}$ . 2000.  $\frac{k}{S_{82:851-859.}}$ s k 45:1063-74. H. 🚚 🖍 . 2002.  $C \bullet_{\mathcal{A}}^{\mathcal{A}}$ , M., (Vipera berus) Ģ C M, A., C. L. P M . 2006.  $\begin{array}{c} \vdots \\ C \\ & \overset{\bullet^{\alpha}}{,} \overset{\bullet^{\alpha}}{,} \overset{\bullet}{,} \overset{\bullet}{$ k k (*Crotalus atrox*): 1999:640-648.  $, ; , L., A. . H_{1}^{s}, . 2002. S. H$ D k : 58:429-436.  $\mathbb{Q} \stackrel{\bullet}{\hookrightarrow} \bullet$ , M. E.,  $\checkmark$  A. H.  $\bullet$ , J. H.  $\bullet$  2004 $\mathbb{P}$  k k (Crotalus adamanteus). 2004:145-151. , C. . P 20 , M. E. . E 1997. T (Charina bottae): , Z . 70:292 300. D : , , F., G. G  $\stackrel{\bullet^{<}_{1}}{\longrightarrow} \stackrel{\bullet^{<}_{2}}{\longrightarrow} \stackrel{\bullet^{<}_{2}}{\longrightarrow} \stackrel{\bullet^{<}_{3}}{\longrightarrow} \stackrel{\bullet^{<}_{4}}{\longrightarrow} \stackrel{\bullet^{<}_{4}$ <u>ر</u>., J.-C.  $\begin{array}{c} & & & \\ F & \bullet^{\wedge} & G., & . & C^{N} & \overset{V}{,} C. & B_{1} & , & \bullet^{\wedge}, \ L. & C & & \\ G & & & , B. & M_{1} & & \bullet^{\wedge}, \ M. & & & \bullet^{\wedge}, \ C. & B_{1} & . & 1994. \ T \end{array}$ NV Crotalus durissus terrificus  $F_1 \bullet_{T_1}^{\mathsf{A}}$ , M. K., M.  $\mathbf{W}_{\mathsf{A}} = \mathbf{\Phi}^{\mathsf{A}}$ ; J.  $\mathbf{W} = \mathbf{\Phi}^{\mathsf{A}}$ , C. A.  $\mathbf{B}_1 = \mathbf{E}_1$ . 1972. k (Crotalus viridis viridis) T 10:81-82.  $\mathbf{E}_{1}$ , J.  $\mathbf{V}_{1}$ , M.  $\mathbf{E}_{1}$ , A. . . 1979, A. k (Crotalus viridis viridis). 18:678-684.  $M_{1} = \frac{1}{2} \cdot M_{2} = \frac{1}{2} \cdot \frac{1}{2}$ k , k M<sub>45:969-85</sub>. . T

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 $H_{\mathbb{T}} \stackrel{\mathcal{V}}{\longleftrightarrow} \stackrel{\mathcal{K}}{\twoheadrightarrow} \mathfrak{g} , A. \quad ., C. \stackrel{\mathcal{V}}{\twoheadrightarrow} P_{\mathbb{T}} \stackrel{\mathcal{V}}{\twoheadrightarrow} \stackrel{\mathcal{K}}{\twoheadrightarrow} , D. \ G. \ B \stackrel{\mathcal{V}}{\twoheadrightarrow} \stackrel{\mathcal{K}}{\twoheadrightarrow} ,$ Μ. E. D<sub>1</sub> , . 2002. k (Crotalus willardi obscurus). . 243-251 *in* G. , H. GW S ( .),M. , 🕼 . M Η Ģ (E М V · P. M ; • 2002. V), Μ, Sistrurus catenatus ( Sistrurus catenatus edwardsii ( ). . М Н . 36:454-464. , N., J<sup>x</sup>., D. A<sup>x</sup>. 2001. **J**●⊀ k . . . 128 : 425-456. J )<sup>1</sup> A ) : . G 173:877-889. IĘ. k K  $\mathbf{P}^{\bullet^{\mathbf{X}}}$ , I. I.,  $\mathbf{Q}$  . D.  $\mathbf{A}^{\bullet^{\mathbf{X}}}_{\mathbf{Y}}$  . 1987. A k (Crotalus 25:1113-1120. vegrandis). T К ", . 1991. Т k . . 405-470 in **A**. T. T ( .), T , H k T T kk , k. . M. 1997. ΝΥ Y V<sup>2</sup> К<sub>11</sub>, s, k. k, W Μ 'N Y :  $\mathbf{v}^2$  k 42:827-840.

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	( : : Crotables durissus).	k,
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