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## Venom Composition in Rattlesnakes: Trends and Biological Significance

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### ABSTRACT.

*Crotalus o. oreganus* (*C. o. concolor*),  
27 k  
S S V  
W  
( )  
M 6 3(6.)-123(T (V))111( )13 2( 9 5.7)

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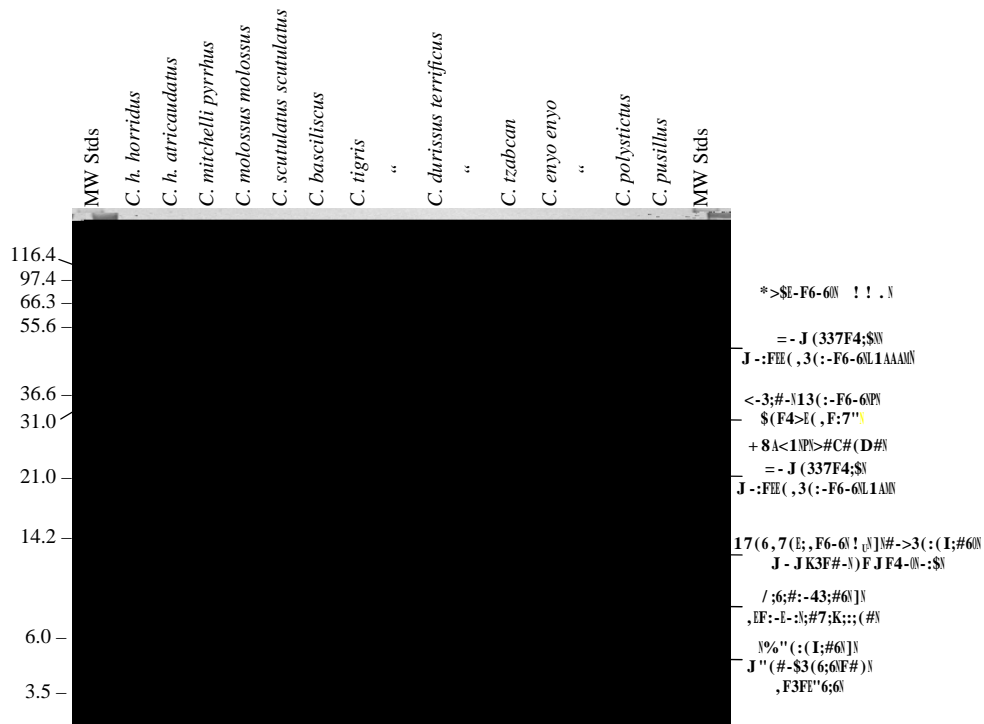
Table 1.

Component Name	Approximate Mass (kDa)	Function	Biological Activity	References
<b>Enzymes</b>				
	94-140	H		M <sub>V</sub> <sup>A</sup> k, 1998; V, 2002
5'- V <sup>A</sup> k	53-82	H	5'-	, 1998; A, 2002
H	90-110	H	N	, 1998; V
	73	H		T, 2001
L ( )	85-150			T, 1998
S k		L		
	48-85	H	H	S, 2005
	43-60			
	25-30			
	20-24			
S T	31-36			; M <sup>k</sup> , 1998; S <sup>k</sup> , 2005
k - k	27-34	H <sup>k</sup> MW <sup>k</sup>		N <sup>k</sup> M <sup>k</sup> , 1998
V <sup>A</sup>	25-36			S <sup>1985</sup>
V <sup>A</sup> <sub>2</sub>	13-15	2+ 2-	M	, 1997, 2003
<b>Non-enzymatic proteins/peptides</b>				
( S )	21-29	k <sup>N</sup> T		Y <sup>k</sup> M, 2004
LV <sup>A</sup> <sub>2</sub>	24	k		V <sup>A</sup> , 1985; V, 1988; V, 1994; L, 1998
	27-29		V <sup>A</sup>	L, 1998
	5.2-15			, 2005
M <sup>A</sup> LV <sup>A</sup> <sub>2</sub>	4-5.3	M <sup>N</sup>	M	L, 1975; L, 1979; N, 1997
<b>Smaller peptides</b>				
k	1.0-1.5			W <sup>2005</sup>
T	0.43-0.4	k	S	1993; k <sup>M</sup> , 2005
<b>Smaller organic compounds</b>				
( <sup>A</sup> VM <sup>H</sup> )	VM <sup>A</sup> = 0.347	(?)	H	V <sup>A</sup> , 2002, 2004
	0.192		S	, 1992; , 1992

M<sup>k</sup> (k), N<sup>k</sup> S k (?)



S Venoms. S k (S L M S<sup>A</sup>).  
 ( S k ),  
 V ( k , 1988), -  
 ( M), , -  
 ).<sup>A</sup> V ( -  
 , M M (C. h. horridus, C. d. -  
 terrificus) (C. polystictus, C. pusil-  
 lus, C. ravus).<sup>A</sup> S M  
 V k .  
 Electrophoresis. 12%  
 (17 , 1.0 k)<sup>N</sup> -  
 ( ).<sup>A</sup> , -  
 2.0 / -  
 15 M TT ( , 12<sub>μL</sub> 94( S )-  
 1 S S -95(1 S . -95(1 S -95(1 16.762) 16.



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

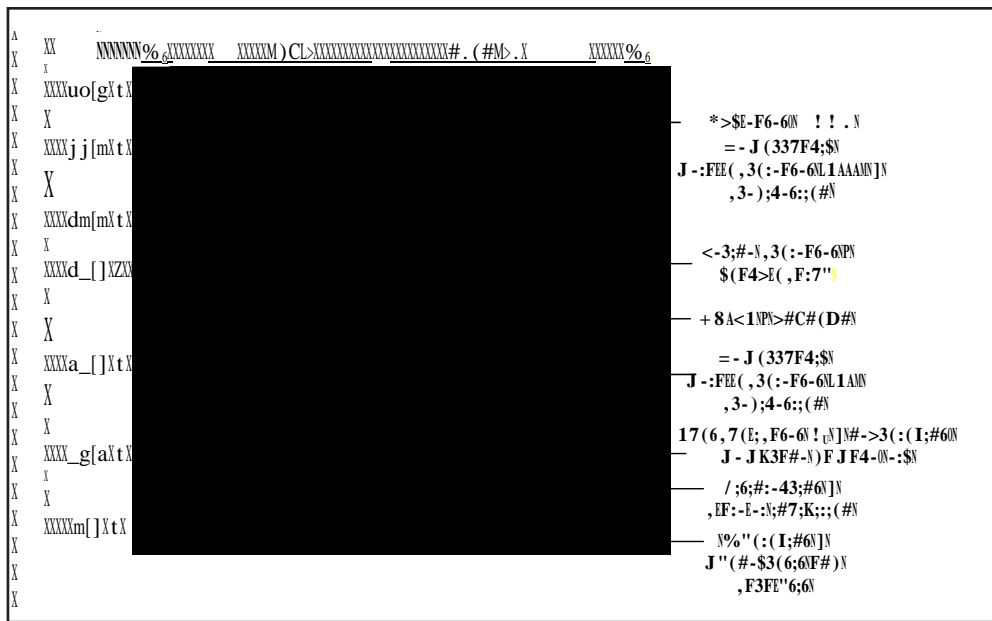


Figure 3.  $\sqrt{S}$   $\sqrt{S}$   $\sqrt{V}$   $\sqrt{A}$   $\sqrt{G}$   
*Crotalus oreganus concolor*,  
 ( k , 2003).  
 M k ,  
 , k  
 ( )  
 k M  
 ,  
 ( ) .



---

T ( 1.0 μ / , ) k ( M k , 2003). T , /

J k , k S ?

( k , 2003).  
M C. d. terrificus, C.  
S. atricaudatus, C. l. klauberi ( ), C. o. concolor, C.  
o. helleri ( ), C. s. scutulatus A, C. tigris, S. c. catena-  
tus, S. c. edwardsii. V

T S C. d.  
collilineatus ( , 1990) C. vegrandis  
( V A L , 1987).

N C. durissus C. oreganus, -

, T -

, k ( -

k , 2006), k ( -

( .6; . W , ) E  
(C. l. klauberi:  
, 1992; C. o. helleri:  
, 2004; C. s.  
scutulatus: G S , 1978, 1989; G , -

1983), k S , -

V A , k , ( ).

Venom ontogeny.

k , -

, / ( , -

1967; , 1972; T k , 1978; -

, 1983; , 1986; k L , -

1988; G , M , 1991; W k , 2003). M

/

, J k -

( - k , k k - k , - k ) -

, k V A 2 -

( M k , 1993 , ) V -

/j

/j (

k ). H ,

:  
( - k ,  
- k ) - ,





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... 1989. *M* *J* *k* (*Crotalus scutulatus scutulatus*) *M* *J* *V* *T* 27:411-418.

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J. E. F. , J. A. Q. -M. ,  
 C. E. P. , M. D. G. .  
 . 2005. T  
 k  
 ( : *Crotalus durissus*).  
 S4:1095-1108. M  
 . M. . 2004. S  
 k  
 T 44:227-231.





