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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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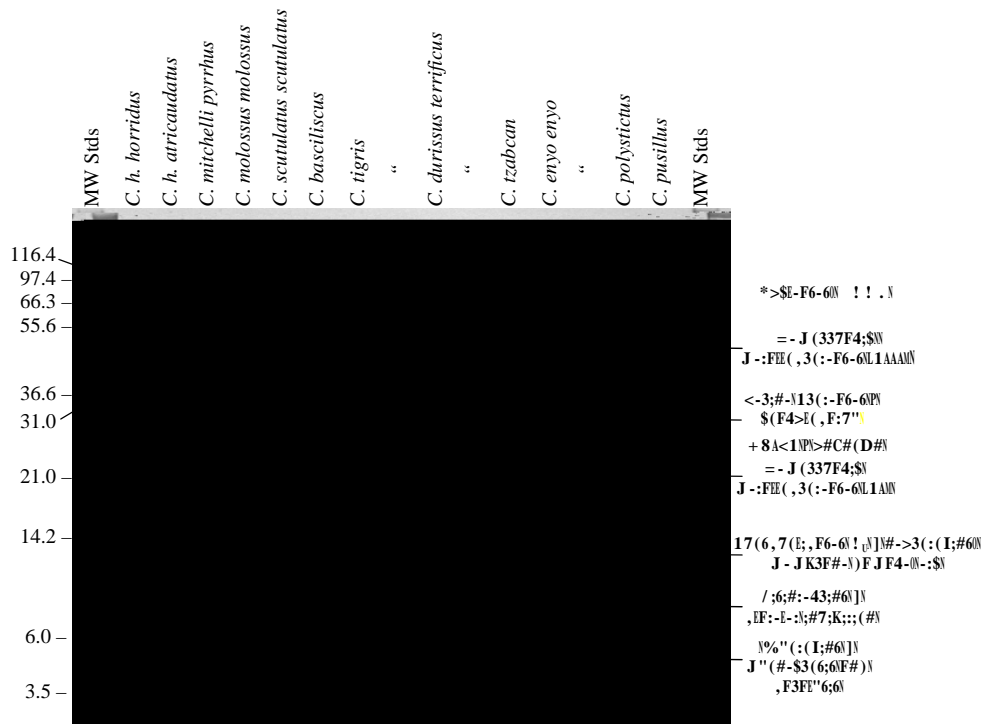
Table 1.

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	L		T, 1998
S k				
	48-85	H	H	S, 2005
	43-60			
	25-30			
	20-24			
S T	31-36			; M <sup>k</sup> , 1998; S <sub>2005</sub>
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 <sub>1985</sub>
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> , 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 <sub>2005</sub>
T	0.43-0.4	k	S	1993; k <sup>M</sup> , 2005
<b>Smaller organic compounds</b>				
( <sup>A</sup> <sub>VM</sub> , H)	<sup>A</sup> <sub>VM</sub> = 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 S<sup>A</sup> ) 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) -  
 ( ). , -  
 2.0 / -  
 15 M TT ( , 12<sub>μL</sub> 94( S )-  
 70 M 10 , 12<sub>μL</sub> 94( S )-  
 1 (( 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 , ( )  
 14 k ,  $\sqrt{A}$   $\sqrt{A^2}$   $\sqrt{V}$  -  
 , , 1992; *C. o. helleri*: , 2004),  
 , , (  $\sqrt{W}$  -  
*C. enyo*, , 2001).  $\sqrt{A}$  k , (  $\sqrt{W}$  -  
*C. l. klauberi*, *C. pricei*, *C. tzabcan*, *S. c. edwardsii*, *C. o.* . H , -  
*concolor* ( . 3).  
 Enzyme assays. - (  $\sqrt{V}$  2),  
 (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*  $\sqrt{M}$  *C.* ,  
*tigris* *C.* ,  
*l. klauberi*  $\sqrt{A^2}$  *C. ruber* = 0.55) 19 0.82 ( $P = 0.04$ ) -  
*C. (Sistrurus) ravus*  $\sqrt{V}$   
*S. c. edwardsii* N ( ).  
*C. tigris* . T - Occurrence of type I and type II venoms and  
 phylogeny. T  
 ( , ) , k (2006;  
 ( ) - k (2006;  
 . 6).  
 Toxicity.  $\sqrt{M}$   $\sqrt{L}^{50}$  *C. l.* ( . , *C. mitchellii*, *C. oreganus*, *C. scutulatus*)  
*klauberi*, *C. pricei*,  $\sqrt{L}^{50}$  *S. c. tergeminus* ( . , *C. durissus* ),  
 ;  
 (T 2).  $\sqrt{N}$   $\sqrt{S}$   $\sqrt{A}$  ( *Sistrurus*) -  
 , :  
 $\sqrt{L}^{50}$  1.0  $\sqrt{L}$  / ,  $\sqrt{L}^{50}$  1-5  $\sqrt{L}$  / ( . . ,  
 4).  $\sqrt{L}^{50}$   $\sqrt{V}$  -

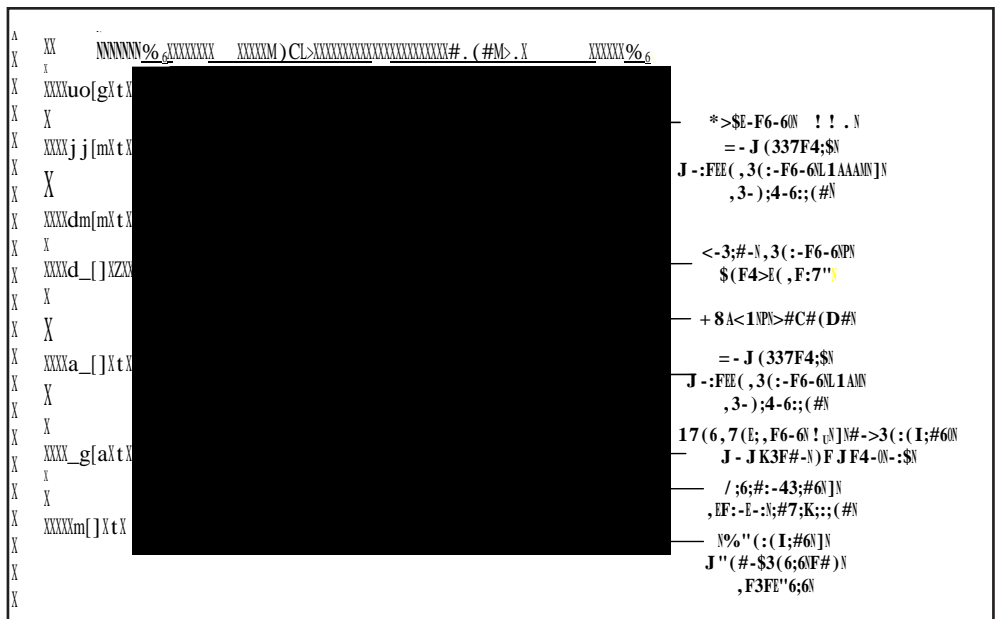


Figure 3.  $\sqrt{S}$   $\sqrt{S}$   $\sqrt{V}$   $\sqrt{AG}$   
*Crotalus oreganus concolor*,  
 ( k , 2003).  
 $\sqrt{M}$  k ,  
 , k ( )  
 k (  $\sqrt{M}$  -  
 ( ) .



---

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, C. tigris, S. c. catena-  
tus, S. c. edwardsii.  
T S C. d.  
collilineatus ( , 1990) C. vegrandis  
( , 1987).  
N C. durissus C. oreganus,  
, T  
, k ( -  
k , 2006), k ( -  
( .6; W , )  
(C. l. klauberi:  
, 1992; C. o. helleri:  
, 2004; C. s.  
scutulatus: G S , 1978, 1989; G ,  
1983), k S , -  
-  
V A , k ,  
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<sup>A2</sup> -  
-  
( k , 1993 , ) V  
/j  
/j ( k ). H ,  
: ( - k ,  
- k ) - ,





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