

Preview*: Temporin-/Vespid Chemotactic Peptide- (or T/V-) Like Peptides and Their Consensus Sequences

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Summary:

The Temporin-/Vespid Chemotactic Peptide- (or T/V-) like peptides are a group of small [average of 13 amino acids (AAs)], linear (no Cysteine), hydrophobic (avg. 65% hydrophobic AAs), positively charged (avg. net charge at pH 7 = +2), structurally very similar, peptide amides that have been isolated from the skins of frogs and the venoms of insects during the past 30 years. Recently, the number of reports of frog T/V-like peptides has been rapidly increasing. At the time of this writing, 119 unique peptides have been isolated from frogs, 13 from wasps, and 11 from scorpions. Many of these peptides have been subjected to biological testing and found to exhibit defensive types of functions (e.g., antimicrobial).

Consensus sequences were first reported for 30 frog T/V-like peptides in 2000 [1], and updated in 2002 (36 peptides) [2] and 2003 (40 peptides) [3] (Table 1). Consensus sequences for wasp peptides were first reported in 2002 (8 peptides) [2], and a combined frog plus wasp consensus sequence was first reported in 2003 (48 peptides) [3]. Table 1 shows these consensus sequences plus several more for 2010. Two 2010 frog consensus sequences were derived from 119 peptides, and neither corresponds to any previously reported, naturally occurring peptide. Two 2010 wasp consensus sequences were derived from 13 peptides. One corresponds to frog peptide, T-1CSb, and the other to wasp peptides, VesCP M and 5h. In addition, there are four 2010 frog plus wasp consensus sequences derived from 132 peptides (119 frog and 13 wasp), and two of these sequences correspond to the frog peptides, T-TOb and T-1CSb, and the wasp peptides, VesCP M and 5h. Biological data has been reported for all four of these naturally occurring peptides.

Consensus sequences may represent ancestral sequences from which other T/V-like peptides evolved, or common sequences toward which T/V-like peptides are evolving.

Table 1. Evolution of the T/V-like peptide consensus sequences during the past decade.

Year	F/W/S	Peps.	Consensus Sequence											
2000	F	30	F-	L-	P-	I/L-	I-	A-	S-	L-	L-	S/G-	K-	L-L-NH ₂
2002	F	36	F-	L-	P-	L-	I-	A-	S-	L-	L-	S-	K-	L-L-NH ₂
“	W	8	F-	L-	P-	I-	I-	G-	K-	L-	L-	G-	G-	L-L-NH ₂
2003	F	40	F-	L-	P-	L-	I-	A-	S-	L-	L-	S-	K-	L-L-NH ₂
“	W	8	F-	L-	P-	I-	I-	G-	K-	L-	L-	G-	G-	L-L-NH ₂
“	F+W	48	F-	L-	P-L/ (I)	-I-	A/ (G)	- S-	L-	L-	S-	K/ (G)	-L-L-NH ₂	
2010	F	119	F-	L-	P-	I-	L-	G-	S-	L-	L-	S-	G/K-	L-L-NH ₂
“	W	13	F-	L-	P-	I-	I-	G-	K-	L-	L-	G/ (S)	-G-	L-L-NH ₂
“	F+W	132	F-	L-	P-	I-	L/I-	G-	S/K-	L-	L-	S-	G-	L-L-NH ₂
“	S	11	I-F/ (I)	-G-	A-	I-	W/ (A)	-G/ (E)	-G/L-L/ (I)	-K-	S-		L-F-NH ₂	

Note: F, frog; W, wasp; S, scorpion; Peps., number of peptides; -NH₂, carboxyl terminal amide.

References:

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