



Fig. S1. SDS-PAGE profile of purified HearNPV BV and ODV virions and their nucleocapsid (NC) and envelope (E) fractions. The proteins were separated by 12% SDS-PAGE and stained with colloidal blue. M: molecular mass markers.

Table S1. Statistical analysis of iTRAQ peptide data for protein localization.

A. Quantification results of HearNPV BV proteins.

No.	Protein	Experiment 1				Experiment 2				Inferred location
		LR Avg	LR LowerCI	LR UpperCI	No of Peptides	LR Avg	LR LowerCI	LR UpperCI	No of Peptides	
1	E25	1.49537	1.17728	1.7472	8	1.44542	1.13659	1.56188	7	E
2	ChiA	1.70856	1.53679	1.84904	8	1.03567	0.71337	1.3188	6	E
3	V-Ubi	1.21507	0.99328	1.52787	4					E
4	HA68	1.26153	0.69146	1.43046	4	0.76373	-0.30056	1.23216	5	E
5	F protein	0.92444	0.79514	1.01425	78	0.91334	0.82477	0.99888	49	E
6	P48	0.3372	-0.04162	1.37165	4	-0.02363	-0.1125	0.13278	3	EC
7	HA69	-0.33377	-0.41411	0.0041	3					EC
8	GP41	-0.34426	-0.44439	-0.17618	3					EC
9	HA128	-0.40313	-0.68181	-0.23449	14	-0.37757	-0.56988	-0.0073	20	EC
10	P10	-0.73837	-0.9527	-0.59761	5	-0.5816	-0.75257	-0.33666	6	EC
11	PKIP	-0.6628	-0.72324	-0.56512	3					EC
12	P78/83					-0.81364	-0.83473	-0.78392	4	NC
13	P26	-0.83577	-0.9717	-0.69705	9	-0.84224	-1.14827	-0.53764	8	NC
14	VP80	-0.86186	-1.45579	-0.48798	4					NC
15	HA57	-1.0924	-1.51794	-0.70293	4					NC
16	HA9	-1.27774	-1.56091	-0.99169	4					NC
17	HA44	-1.51035	-1.75727	-1.22077	15	-1.42146	-1.72972	-1.12716	13	NC
18	HA66	-1.65882	-2.1651	-1.09044	7	-1.35932	-2.23847	-0.34476	7	NC
19	FGF	-1.38133	-1.50275	-1.20764	25	-1.68295	-1.80585	-1.4219	23	NC
20	POLH	-1.58207	-1.94877	-1.25649	4	-1.58146	-1.94335	-1.22651	5	NC

21	PK-1	-1.73667	-2.18207	-1.3323	3	-1.61204	-2.444	-1.10567	3	NC
22	P12	-1.72656	-2.55831	-1.10572	3					NC
23	ME53	-1.87674	-2.13486	-1.65591	18	-1.67308	-2.00452	-1.16442	15	NC
24	C42	-1.64107	-2.78671	-0.80466	3	-2.57507	-3.36275	-1.9252	3	NC
25	VP39	-1.98823	-2.22964	-1.75273	64	-2.32096	-2.7304	-1.87506	39	NC
26	PEP	-2.62718	-3.43899	-1.49213	5					NC

B. Quantification results of HearNPV ODV proteins.

	Protein	Experiment 1				Experiment 2				Inferred location
		LR Avg	LR LowerCI	LR UpperCI	No of Peptides	LR Avg	LR LowerCI	LR UpperCI	No of Peptides	
1	HA72	2.2924	1.9555	2.8749	3					E
2	E25	1.707	1.3508	2.0826	13	2.4594	2.0516	2.739	11	E
3	E66	2.1209	1.888	2.3728	41	2.0145	1.6125	2.3788	47	E
4	GP41	2.0107	1.9185	2.0934	672	2.0433	1.9581	2.1151	751	E
5	HA95	2.0136	1.5008	2.8468	3					E
6	P33	1.8409	1.4811	2.164	12	2.0856	1.8029	2.3727	12	E
7	SOD	2.0578	1.4688	2.6676	4	1.8336	1.6686	2.0261	5	E
8	HA9	2.0395	1.9798	2.0874	780	1.7786	1.7164	1.8314	803	E
9	P74	1.9521	1.7399	2.2202	17	1.6949	1.1848	2.1561	12	E
10	PIF6	1.7353	1.4368	2.187	4	1.7218	1.1936	2.2157	5	E
11	EC43	1.5928	1.4956	1.6852	261	1.704	1.6004	1.7911	395	E
12	HA69	1.3555	0.929	1.8189	4	1.931	1.5368	2.3888	4	E
13	PIF3	1.5666	1.2848	2.451	3	1.5623	1.5019	1.6215	3	E
14	VP91	1.4854	1.3197	1.6719	31	1.3804	1.0237	1.7046	30	E
15	PIF1	1.4014	0.9494	1.7543	11	1.4261	1.1342	1.744	13	E
16	PIF2	1.3378	1.1312	1.5409	24	1.4111	1.2639	1.5398	18	E

17	V-Ubi	1.2963	1.0764	1.6612	6	1.2157	0.9691	1.4307	10	E
18	PIF5	0.6524	0.431	0.8839	71	1.0749	0.8945	1.2653	75	E
19	VP80	0.7276	0.6695	0.7797	268	0.686	0.6053	0.7479	257	E
20	HA100	0.4971	0.403	0.5926	61	0.5851	0.4432	0.7034	53	EC
21	HA13	0.1257	-0.02	0.2857	4					EC
22	FP25K	0.074	-0.0178	0.1783	6					EC
23	HA66	-0.0697	-0.0971	-0.0438	539	0.1075	0.0781	0.1367	564	EC
24	P78/83	-0.258	-0.5114	0.001	52	0.247	0.0015	0.4395	74	EC
25	HA43	-0.0753	-0.2566	0.1605	5					EC
26	HA39	-0.6125	-0.8375	-0.2775	7					EC
27	POHL	-1.0975	-1.1672	-1.0283	477	-0.9902	-1.0848	-0.9086	436	NC
28	VLF-1	-1.2275	-1.3917	-1.0729	15	-0.9501	-1.0871	-0.8428	14	NC
29	HA44	-1.3642	-1.4818	-1.2226	356	-1.0007	-1.1286	-0.8534	338	NC
30	HA52	-1.2931	-1.6738	-0.8612	10	-1.0995	-1.4519	-0.7889	15	NC
31	PEP	-1.4174	-1.6268	-0.9864	4					NC
32	HA90	-1.8505	-1.9936	-1.6382	74	-1.2713	-1.4595	-1.0821	80	NC
33	VP39	-1.686	-1.7512	-1.6171	1133	-1.7315	-1.7973	-1.6614	1140	NC
34	HA45	-1.6654	-2.2954	-1.0744	3	-1.853	-2.0151	-1.7285	4	NC
35	HA51	-1.8804	-2.1328	-1.6298	29	-1.641	-1.8144	-1.4222	38	NC
36	EC27	-1.779	-2.2455	-1.3877	19	-1.9941	-2.321	-1.6642	15	NC
37	C42	-2.2089	-2.5534	-1.9067	36	-1.7283	-1.9851	-1.4611	34	NC
38	VP1054	-2.5043	-2.8334	-2.233	7					NC

LR Avg: log-ratio point estimation, which is weighted average of log-ratio for (E/NC).

LR lowerCI: lower limit of 95% confidence interval for log-ratio estimation.

LR upperCI: upper limit of 95% confidence interval for log-ratio estimation

Table S2. Host proteins associated with HearNPV BV and ODV.

A. Host proteins associated with HearNPV BV.

Classification	Protein	Abbreviation	GI no.	Species	Other virus(es) reported to contain protein^a
Cytoskeleton	Actin, cytoplasmic A3a	Actin	gi 3182902	Helicoverpa armigera	AcMNPV BV (1), AIHV (2), EBV (3), HCMV (4), HIV (5), HSV (6), IV (7), KSHV (8), MMLV (9), MPV (10), RSV (11), VV (10)
	Actin-depolymerizing factor 1	ADF-1	gi 95103010	Bombyx mori	AcMNPV (1)
	Alpha tubulin	α -tubulin	gi 237636934	Heliothis virescens	EBV (3), HCMV (4), HIV (5), IV (7), KSHV (12), RSV (11), VV (13)
	Beta tubulin	β tubulin	gi 19773428	Bombyx mori	EBV (3), HCMV (4), IV (7), RSV (11), VV (13)
	Abnormal wing disc protein	AWD	gi 21435082	Choristoneura parallela	
	Kinesin heavy chain	KHC	gi 309384283	Bombyx mori	
	Microtubule-associated protein RP/EB family member 3	MAPRE3	gi 87248487	Bombyx mori	
	Moesin Chain A	Moesin	gi 122920505	Spodoptera frugiperda	EBV (3), HCMV (4), KSHV (8, 12), MMLV (9), MPV (10), RSV (11), VV (10)
	Myosin II essential light chain	Myosin II ELC	gi 98990267	Bombyx mori	
	Profilin	Profilin	gi 56404766	Bombyx mori	HCMV (4), HIV (5), HSV (6), IV (7)
	Septin	SEPT	gi 95102582	Bombyx mori	
	Thymosin isoform 2	Thymosin	gi 289900835	Helicoverpa armigera	IV (7)
DNA binding	Histone H2B-like protein	H2b-1	gi 237648982	Bombyx mori	AIHV (2), HIV (5)
	Histone H4-like protein	H4	gi 223972586	Bombyx mori	AIHV (2), HIV (5, 14), MMLV (9)
Transcription and Translation	Translation initiation factor 2 alpha subunit	eIF-2 α	gi 27462592	Spodoptera frugiperda	EBV (3)

Elongation factor-1 alpha	eEF-1 α	gi 767847	Helicoverpa armigera	EBV (3), HCMV (4), HIV (5, 14), RSV (11) , VV(13)
Translation elongation factor 2	eEF-2	gi 28627569	Spodoptera exigua	EBV (3), HCMV (4), HIV (5), KSHV (8)
Translation initiation factor 2 gamma subunit	eIF2 γ	gi 51965708	Bombyx mori	
Eukaryotic translation initiation factor 4A	eIF-4A	gi 73695588	Bombyx mori	HCMV (4)
Eukaryotic translation initiation factor 5	eIF-5	gi 112983206	Bombyx mori	
Eukaryotic translation initiation factor 5A	eIF-5A	gi 76786562	Bombyx mori	
Eukaryotic initiation factor 5C	eIF-5C	gi 189031276	Helicoverpa armigera	
Ribosomal protein L14	RPL14	gi 15213764	Spodoptera frugiperda	
Ribosomal protein L22	RPL22	gi 116833097	Helicoverpa armigera	
Ribosomal protein L23	RPL23	gi 54609237	Bombyx mori	
Ribosomal protein L4	RPL4	gi 170280411	Heliothis virescens	
Ribosomal protein L6e	RPL6e	gi 161015753	Spodoptera exigua	
60S acidic ribosomal protein P0	RPP0	gi 18253041	Spodoptera frugiperda	VV (13)
60S acidic ribosomal protein P2	RPP2	gi 18253045	Spodoptera frugiperda	
Ribosomal protein S12	RPS12	gi 54609307	Bombyx mori	
Ribosomal protein S19	RPS19	gi 15213826	Spodoptera frugiperda	
Ribosomal protein S20e	RPS20e	gi 50284390	Papilio dardanus	
Ribosomal protein S3	RPS3	gi 16566719	Spodoptera frugiperda	
40S ribosomal protein S4	RPS4	gi 74844658	Spodoptera frugiperda	
Ribosomal protein L5	RPL5	gi 268306434	Manduca sexta	
Translational controlled tumor protein	TCTP	gi 294862569	Helicoverpa armigera	

Post-translational modification	Protein disulfide isomerase	PDI	gi 328670881	Helicoverpa armigera	HCMV (4), HIV (5)
	Arg methyltransferase	PRMT	gi 321442023	Spodoptera frugiperda	
Chaperone	Calreticulin	Calreticulin	gi 75013004	Bombyx mori	HCMV (4)
	Chaperonin subunit 4 delta	CCT4 δ	gi 87248081	Bombyx mori	
	Chaperonin subunit 6a zeta	CCT6A	gi 87248083	Bombyx mori	
	Heat shock protein 70	HSP70	gi 219671577	Helicoverpa armigera	EBV (3), HCMV (4), HIV (14), HSV (6), KSHV (8, 12), MMLV (9), RSV (11), VV (13)
	90-kDa heat shock protein	HSP90	gi 310893429	Helicoverpa armigera	EBV (3), HCMV (4), HIV (5), KSHV (8), RSV (11)
	Heat shock protein 105	HSP105	gi 328670879	Helicoverpa armigera	
	Chaperonin containing t-complex polypeptide 1 beta subunit	TCP-1 β (CCT2)	gi 87248085	Bombyx mori	HIV (5)
	Chaperonin containing t-complex polypeptide 1 theta subunit	TCP-1 θ (CCT8)	gi 120444903	Bombyx mori	EBV (3)
Protein degradation	Proteasome alpha 3 subunit	PSMA3	gi 95102712	Bombyx mori	
	Proteasome zeta subunit	PMSA5	gi 87248207	Bombyx mori	
	Proteasome 26S subunit 6A	PSMA6-A	gi 308512763	Biston betularia	
	Proteasome 26S non-ATPase subunit 7	PSMD7	gi 95103074	Bombyx mori	
Molecular transport	ATP-binding cassette sub-family C member 1	ABCC1	gi 283855787	Trichoplusia ni	
	Chloride intracellular channel isoform 1	CLIC	gi 95102944	Bombyx mori	HIV (5), PRV (15)
	Fatty acid-binding protein 3	FABP3	gi 171740911	Helicoverpa armigera	
	Karyopherin beta 3	KPNB3	gi 183979303	Papilio xuthus	
	GTP-binding nuclear protein Ran	RAN	gi 87248587	Bombyx mori	HIV (5)

Vesicle transport	ADP-ribosylation factor	ARF	gi 87248075	Bombyx mori	AcMNPV (1), HIV (5), HSV (6)
	Annexin B	Annexin B	gi 238915969	Heliothis virescens	AcMNPV (1)
	Annexin isoform 2	Annexin X	gi 87248455	Bombyx mori	
	Annexin IX	Annexin IX	gi 328670889	Helicoverpa armigera	
	Clathrin heavy chain	CHC	gi 219362829	Bombyx mori	EBV (3), HCMV (4), HIV (5), MMLV (9)
	Coatomer protein complex subunit delta	COPD	gi 289629216	Bombyx mori	
	N-ethylmaleimide sensitive fusion protein	NSF	gi 57903680	Helicoverpa armigera	
	Small GTP binding protein RAB5	RAB5	gi 99082892	Bombyx mori	AcMNPV BV (1), HIV (5), HSV (6)
	Small GTP binding protein RAB7	RAB7	gi 95102652	Bombyx mori	HIV (5), HSV (6), KSHV (8), MMLV (9), PRV (15)
	Small GTP-binding protein RAB10	RAB10	gi 148298847	Bombyx mori	HSV (6)
	Ras-related GTP-binding protein RAB11	RAB11	gi 112983314	Bombyx mori	AcMNPV BV (1), HIV (5), HSV (6)
	Syntaxin	Syntaxin	gi 321440845	Platynota idaeusalis	PRV (15)
	Transitional endoplasmic reticulum ATPase TER94	TER94	gi 95102992	Bombyx mori	
	Vesicle amine transport protein	VAT	gi 95103100	Bombyx mori	
	Signaling	V-type proton ATPase subunit B	V-ATPase B	gi 302138846	Helicoverpa armigera
H ⁺ transporting ATPase subunit D		V-ATPase D	gi 307695440	Helicoverpa armigera	HIV (5), MMLV (9)
14-3-3 zeta		14-3-3 ζ	gi 239736502	Helicoverpa armigera	AcMNPV BV (1), HCMV (4), HSV (6), KSHV (8)
14-3-3 epsilon protein		14-3-3 ε	gi 148298752	Bombyx mori	EBV (3), HCMV (4), HSV (6), PRV (15)
Arginine kinase		AK	gi 156968301	Helicoverpa armigera	
Casein kinase 2 alpha subunit		CK II α	gi 62042001	Bombyx mori	AcMNPV BV (1), HCMV (4), HSV (6), PRV (15)

	GTP-binding protein alpha subunit	alpha	G α	gi 61808332	Helicoverpa armigera	
	Heterotrimeric nucleotide-binding protein beta subunit	guanine	G β	gi 95103038	Bombyx mori	PRV (15)
	Heterotrimeric binding protein gamma subunit	guanine nucleotide	G γ	gi 116833155	Helicoverpa armigera	
	G protein alpha subunit Go		Go	gi 56342245	Bombyx mori	
	Putative lethal (2) giant larvae		Lgl	gi 261335917	Heliconius melpomene	
	Protein phosphatase 2 regulatory subunit A alpha isoform		PP2A	gi 329130427	Helicoverpa armigera	HCMV (4),
	Receptor for activated protein kinase C homolog		RACK	gi 338190281	Helicoverpa armigera	
	Small GTPase		Rho1	gi 23573606	Spodoptera frugiperda	AcMNPV BV (1), PRV (15)
Immunity	Cyclophilin A		CyP A	gi 298111994	Mythimna separata	HCMV (4), HIV (5, 14), HSV (6), IV (7), KSHV (8)
	pxS-adenosyl-L-homocysteine hydrolase		px-AHH	gi 117970173	Plutella xylostella	
Antioxidation	Cytochrome b5		CYB5	gi 3511145	Helicoverpa armigera	
Metabolism	Phosphoribosylaminoimidazole carboxylase		AIR carboxylase	gi 95102674	Bombyx mori	
	Aldo-keto reductase		AKR	gi 328670873	Helicoverpa armigera	
	Carboxyl/choline CCE014a	esterase	CCE014a	gi 294846804	Helicoverpa armigera	
	ATP synthase		F-ATPase β	gi 300250972	Helicoverpa zea	HIV (5)
	Fructose aldolase	1,6-bisphosphate	FBA	gi 45330818	Antheraea yamamai	

Glyceraldehyde-3-phosphate dehydrogenase	GAPDH	gi 90309026	Bombyx mori	EBV (3), HCMV (4), HIV (5, 14), HSV (6), IV (7), KSHV (8), MMLV (9), RSV (11)
Glycyl-tRNA synthetase	GARS	gi 665680	Bombyx mori	
Glutathione S-transferase	GST	gi 289719016	Helicoverpa armigera	HIV (5), IV (7), PRV (15)
Juvenile hormone epoxide hydrolase	JHEH	gi 299481057	Helicoverpa armigera	
Mitochondrial aldehyde dehydrogenase	mtALDH	gi 87248351	Bombyx mori	
Phosphoglycerate kinase	PGK	gi 312597600	Bombyx mori	EBV (3), HCMV (4), HIV (5), IV (7), KSHV (8), VV (13)
Seryl-tRNA synthetase	SerRS	gi 328670885	Helicoverpa armigera	
Transketolase	TKT	gi 87248239	Bombyx mori	HCMV (4)
Triosephosphate isomerase	TPI	gi 154707830	Helicoverpa armigera	HCMV (4), HIV (5), HSV (6)
Thioredoxin peroxidase	TPx	gi 159459926	Helicoverpa armigera	

B. Host proteins associated with HearNPV ODV.

Classification	Protein	Abbreviation	GI no.	Species	Other virus(es) reported to contain protein ^a
Cytoskeleton	Actin, cytoplasmic A3a	Actin	gi 3182902	Helicoverpa armigera	AcMNPV BV (1), AIHV (2), EBV (3), HCMV (4), HIV (5), HSV (6), IV (7), KSHV (8), MMLV (9), RSV (11), VV (13)
	Actin-depolymerizing factor 1	ADF-1	gi 95103010	Bombyx mori	AcMNPV BV (1), HSV (6)
	Profilin	Profilin	gi 56404766	Bombyx mori	HCMV (4), HSV (6), IV (7), PRV (15)
	Transgelin	Transgelin	gi 95102666	Bombyx mori	HCMV (4), IV (7), MPV (10), VV (10), PRV (15)
Transcription and Translation	Eukaryotic translation initiation factor 5A	eIF5A	gi 76786562	Bombyx mori	
	Sr protein	SR	gi 87248221	Bombyx mori	AcMNPV BV (1)
	Translational controlled tumor protein	TCTP	gi 294862569	Helicoverpa armigera	
Chaperone	Heat shock protein 70	HSP70	gi 219671577	Helicoverpa armigera	EBV (3), HCMV (4), HIV (5, 14), HSV (6), KSHV (8), MMLV (9), RSV (11), VV (13)
Posttranslational modification	Serine protease	Serine protease	gi 297340778	Helicoverpa armigera	HIV (5, 14)
Molecular transport	Diazepam-binding inhibitor	DBI	gi 40022264	Helicoverpa armigera	IV (7)
	Fatty acid-binding protein 3	FABP3	gi 171740911	Helicoverpa armigera	
Vesicle transport	Small GTP binding protein Rab7	RAB7	gi 95102652	Bombyx mori	AcMNPV BV (1), HIV (5), HSV (6), KSHV (8), MMLV (9), PRV (15), VV (13)
Signaling	14-3-3 zeta	14-3-3 ζ	gi 239736502	Helicoverpa armigera	AcMNPV BV (1), HCMV (4), HSV (6), KSHV (8)
	14-3-3 epsilon	14-3-3 ε	gi 95102932	Bombyx mori	EBV (3), HCMV (4), HSV (6), PRV (15)
	Cyclin 3	Cyclin 3	gi 158508578	Bombyx mori	
	Ubiquitin	Ubiquitin	gi 38373984	Helicoverpa armigera	AcMNPV BV (1), HCMV (4), HIV (5, 14), HSV (6), IV

					(7), MMLV (9), RSV (11), VV (13)
	Ubiquitin-related modifier protein	URM	gi 294714040	Helicoverpa armigera	
Immunity	Cyclophilin A	CyPA	gi 298111994	Mythimna separata	HCMV (4), HIV (5, 14), HSV (6), IV (7)
	FK506-binding protein	FKBP	gi 95102696	Bombyx mori	
Antioxidation	Glutaredoxin	GRX	gi 87248503	Bombyx mori	
	Thioredoxin	Trx	gi 124127033	Bombyx mori	PRV (15)

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Table S3. Summary of the gene knockout effects on the homologues of the BV and ODV proteins.

No.	Protein*	HearNPV		ORF			Gene knockout references ^s			Gene knockout effects ^{&}	Interpreted protein category
		virion-associated [#]	ODV	HearNPV	AcMNPV	BmNPV	HearNPV	AcMNPV	BmNPV		
1	P78/83	BV	ODV	2	9	2	[1] ^b	[2] ^b	[3] ^b	^b Lethal	Structural protein
2	HOAR		ODV	4	-	-					
3	<u>HA9</u>	BV	ODV	9	142	118		[4] ^b , [5] ^a	[6] ^a	^a Lethal with absent nucleocapsid; ^b Lethal	Structural protein
4	<u>E18</u>	BV	ODV	10	143	119		[7] ^b	[3] ^d	^b Lethal; ^d Severely affect BV production	Very likely structural protein
5	<u>EC27</u>	BV	ODV	11	144	120		[5] ^a	[3] ^b	^a Lethal with absent nucleocapsid; ^b Lethal	Structural protein
6	<u>PIF5</u>		ODV	15	148	124		[8,9] ^c	[10] ^c	^c Inactivation of ODV infectivity	Structural protein; likely to be trapped protein in BV
7	<u>P74</u>		ODV	20	138	115	[11] ^c	[12] ^c	[3] ^e	^c Inactivation of ODV infectivity; ^e No effect on BV production	Structural protein
8	ME53	BV		16	139	116		[13] ^d , [14] ^b	[3] ^d	^b Lethal; ^d Severely affect BV production	Very likely structural protein
9	P26	BV		22	136	113		[15] ^e	[3] ^e	^e No effect on BV production	Might be trapped protein
10	LEF-6	BV		24	28	19		[16] ^d	[3] ^e	^d Low production of BV; ^e No effect on BV production	Might be either structural or trapped protein
11	HA26		ODV	26	26	17			[3] ^d	^d Severely affect BV production	Might be either structural or trapped protein
12	V-Ubi	BV	ODV	28	35	26		[17] ^d	[3] ^e [18] ^e	^d Low production of BV; ^e No effect on	Might be either

									BV production	structural or trapped protein		
13	HA39		ODV	39	51	40		[3] ^b	^b Lethal	Very likely structural protein		
14	ChiA	BV		41	126	103		[19] ^d	^d Affect liquefaction of the infected host; ^e No effect on BV production	Might be either structural or trapped protein		
15	HA44	BV	ODV	44	-	-						
16	HA45		ODV	45	-	-						
17	<u>VP1054</u>		ODV	47	54	43		[20] ^a	^a Lethal with malformed nucleocapsid; ^b Lethal	Very likely structural protein		
18	HA51	BV	ODV	51	58/59	47		[21] ^d	^d Increase BV production and DNA accumulation; ^e No effect on BV production	Might be either structural or trapped protein		
19	HA52		ODV	52	60	48			^e No effect on BV production	Might be either structural or trapped protein		
20	FP25K	BV	ODV	53	61	49		[22] ^d	[23] ^d	[3] ^e , [24-26] ^d	^d Increase BV production; reduction of ODV; affect nuclear transport of ODV envelope proteins; affect post-mortem host degradation; ^e No effect on BV production	Very likely structural protein
21	HA57	BV		57	-	-						
22	GP37	BV		58	64	52		[27] ^e	[3] ^e	^e No effect on BV production;	Might be trapped protein	
23	<u>PIF6</u>		ODV	64	68	56		[28,29] ^c	[3] ^e	^c Inactivation of ODV; ^e No effect on BV	Structural protein	

24	<u>HA66</u>	BV	ODV	66	66	54	[30] ^d	[3, 31] ^b	production ^b Lethal, ^d Severely affect BV production	Structural protein
25	HA68	BV		68	74	60		[32] ^d	^d With 10 fold lower BV production	Might be either structural or trapped protein
26	HA69	BV	ODV	69	75	61		[3, 33] ^b	^b Lethal	Might be either structural or trapped protein
27	<u>VLf-1</u>		ODV	71	77	63	[34,35] ^a	[3] ^b	^a Lethal with malformed nucleocapsid; ^b Lethal	Structural protein
28	<u>HA72</u>		ODV	72	78	64		[3] ^b	^b Lethal	Might be either structural or trapped protein
29	<u>GP41</u>	BV	ODV	73	80	66	[36] ^d	[3] ^d	^d Severely affect BV production; affect nucleocapsid egress from the nucleus	Structural protein
30	<u>HA74</u>		ODV	74	81	67		[3, 37] ^b	^b Lethal	Might be either structural or trapped protein
31	<u>VP91</u>		ODV	76	83	69		[3] ^b	^b Lethal	Might be either structural or trapped protein
32	<u>VP39</u>	BV	ODV	78	89	72		[3] ^b	^b Lethal	Structural protein
33	<u>P33</u>		ODV	80	92	75	[38] ^b , [39] ^d	[3] ^b	^b Lethal; ^d Severely affect BV production	Very likely structural protein
34	E25	BV	ODV	82	94	77	[40] ^d	[3] ^b	^b Lethal; ^d Severely affect BV and ODV production	Very likely structural protein

35	<u>PIF4</u>		ODV	85	96	79	[41] ^c	[42] ^c	[3] ^b	^c Inactivation of ODV; ^b Lethal	Structural protein
36	<u>38K</u>	BV	ODV	86	98	82		[43] ^a	[3] ^b	^a Lethal with malformed nucleocapsids; ^b Lethal	Very likely structural protein
37	<u>P6.9</u>	BV	ODV	88	100	84		[44] ^a	[3] ^b	^a Lethal with malformed nucleocapsids; ^b Lethal	Structural protein
38	<u>C42</u>	BV	ODV	89	101	85		[5] ^a	[3] ^b	^a Lethal with absent nucleocapsids; ^b Lethal	Structural protein
39	P12	BV	ODV	90	102	86		[45] ^b	[3] ^b	^b Lethal	Very likely structural protein
40	<u>P48</u>	BV		91	103	87		[46] ^b	[3] ^b	^b Lethal	Very likely structural protein
41	VP80	BV	ODV	92	104	88		[47] ^b	[3, 48] ^b	^b Lethal	Structural protein
42	<u>EC43</u>		ODV	94	109	92		[49] ^b , [50] ^a	[3] ^b	^a Lethal with absent nucleocapsids; ^b Lethal	Structural protein
43	ODV-E66		ODV	96	46	37		[51] ^c	[3] ^e	^c Inactivation of ODV; ^e No effects on BV production	Structural protein
44	<u>PIF3</u>		ODV	98	115	95	[11] ^c	[52] ^c	[3] ^e	^c Inactivation of ODV; ^e No effects on BV production	Structural protein
45	HA100	BV	ODV	100	-	-	[53] ^d			^d Affect ODV infectivity	Very likely structural protein
46	SOD		ODV	106	31	23		[54] ^e	[3] ^e	^e No effect on BV production; No effects for <i>in vitro</i> and <i>in vivo</i> infection	Might be trapped protein
47	<u>PIF1</u>		ODV	111	119	97	[11] ^c	[52, 55] ^c	[3] ^e	^c Inactivation of ODV; ^e No effects on BV production	Structural protein
48	FGF	BV		113	32	24		[56] ^e	[3] ^e , [57] ^d	^e No affect on BV production; ^d Lower BV production and longer killing time in	Very likely structural protein

										larvae		
49	P24	BV	ODV	118	129	106			[3] ^e	^e No affect on BV production	Might be trapped protein	
50	PEP	BV	ODV	120	131	108			[3] ^e	^e No affect on BV production	Might be trapped protein	
51	HA128	BV		128	17	9	[58] ^d		[3] ^e , [59] ^d	^d Delayed BV production; Lower BV production; ^e No effects on BV production	Might be trapped protein	
52	PKIP	BV		130	24	15			[3] ^d	^d Severely affect BV production	Might be either structural or trapped protein	
53	<u>PIF2</u>		ODV	132	22	13	[11, 60] ^c	[52,55] ^c	[3] ^e	^c Inactivation of ODV; ^e No effects on BV production	Structural protein	
54	F protein	BV		133	23	14	[61] ^b	[62, 63] ^d	[3] ^e	^b Lethal; ^d With some effects on BV and ODV; ^e No affect on BV production	Structural protein	

*Proteins conserved in all baculoviruses are underlined.

#The information of BV/ODV associated protein are according to that of Figure 4.

\$For each reference, the effects of the gene knockout is marked as following: ^aLethal with malformed or absent nucleocapsids; ^bLethal; ^cInactivation of ODV; ^dSome effects; ^eNo effects.

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