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## HPV and Animal PV Nucleic Acid Sequences

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### New Sequences

Eight new partial genetic sequences of HPVs have been released since the 1996 HPV compendium was published. The sequence of HPV-74 is mostly complete, containing the genes L2, L1, E6, E7 and the LCR. Four new types in the RTRX series (group B1), namely RTRX7 through RTRX10, are presented here as well as another new A supergroup virus, A6053. Finally, two new B1 group sequences, called HPVUWS A and D, known only from the MY09/11 region, have been released.

Of particular interest this year is the publication of thirteen new Rhesus monkey consensus primer region (partial L1) sequences, RhPVa through RhPVm [1]. These new sequences define three new clades within the “A” supergroup, which we have called A12, A13, and A14. The sequences point to the potential diversity of papillomaviruses in mammals, the Rhesus being the only nonhuman mammal in which papillomaviruses have been systematically sought. The Colobus monkey sequence CgPV-1 has now been sequenced over the MY09/11 region, and a new Colobus sequence, CgPV-2, the first animal sequence to fall in the B-1 (EV) group, has also been released. A review article of animal papillomaviruses by S-Y Chan and H-U Bernard appears in Part III of this compendium. In addition to the RhPVs we publish two new complete genomes this year of the ovine papillomaviruses, OvPV-1 and OvPV-2, and several other partial sequences from other animal hosts.

### Sequence Tables

These new sequences are published in full herein, beginning on page I-13, and have been added to the list and cross reference of all HPV and animal PV sequences presented in Table I-1 (page I-2), where they are highlighted by a ✓ character. The table is ordered by HPV type, with viruses of uncertain or probable “new” type listed last. The animal viruses are tabulated together in Table I-2 even though some of them are more closely related phylogenetically to certain HPVs than they are to other animal PVs. Included in the Tables are the viral TYPE, the LOCUS names we use, the GROUP designation as used in the 1994 compendium, the equivalent new GROUP designation [2], the original GenBank LOCUS name, the GenBank ACCESSION NUMBER, the REGION of the genome sequenced, and the page number on which the sequence is located. The page number is preceded by a (94), (95), (96), or (97) indicating the year of the compendium in which the sequence was published. Several animal papilloma virus sequences (e.g., MMPV) that are only distantly related to other PVs probably represent taxa at the “supergroup” level. These are indicated in the fourth column of the table by the letter S. All the sequences in this table are available through our World Wide Web site at <http://hpv-web.lanl.gov>.

### Revised Sequences

A number of sequencing errors in reference HPV clones have come to light recently, necessitating the republishing of corrected sequences [3]. The corrected sequences of HPV-1a, HPV-5, HPV-6b, and HPV-18 are presented at the end of this chapter.

### Phylogenetic Tree

The large number of new sequences published over the last three years has motivated us to generate a new phylogenetic tree of the papillomavirus family (Figure 1, page I-3). This tree, which

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contains 108 PV sequences, was computed for the L1 consensus primer region (CPR) using the neighbor joining method and a distance matrix calculated with a modified Kimura 2-parameter model (transition/transversion ratio 2.0). The PHYLIP package as implemented in the Genetics Data Environment (GDE) was used for the actual computation. In the figure the five PV supergroups (A–E) are shown by the outermost wide gray arcs. Two sequences, MnPV and FPV1, are thought to represent as-yet-undesignated Supergroups and are labeled with a large letter S to indicate this. The groups, which comprise the supergroups, are indicated by inner arcs of gray. Each tree branch is labeled with an abbreviated sequence name. For HPVs the “type” number alone is given in most cases, so the branch labeled 40 is that of HPV40. A few HPVs have no type number yet assigned to them, e.g. HPVMM4, which is shown on the tree as MM4. The new Rhesus monkey sequences form three clades, here labeled A12, A13, and A14, whose branches are abbreviated so that Rha, for example, stands for RhPV-a in the nomenclature of Chan and Bernard [1]. Animal PV branches are labeled with the full locus name.

Neighbor-joining analysis is a convenient and rapid way to get an initial estimate of branching relationships, especially when a large number of taxa are involved. A more accurate depiction of distance relationships is achieved by inversely weighted parsimony [4]. Figure 2 below is a cladistic analysis of E6 sequences (first and second positions of codons only) which employed inversely weighted parsimony: from an initial parsimony analysis (PAUP), the twelve possible substitution frequencies (A to G, C to T, C to A, etc.) were determined; a weighting matrix was then constructed (MacClade) in which the rarest substitutions were given the greatest weight and the commonest substitutions were given the least weight. Since only first and second positions in codons were considered, this analysis tends to reduce noise from superimposed hits and chance convergence (homoplasy). The parsimony analysis is re-run using the matrix. While the branch lengths no longer reflect single base changes, the relative distances are highly informative.

## References

- [1] Chan, S-Y, Bernard, H-U, Ratterree, R. R., Birkebak, T. A., Faras, A. J., and Ostrow, R. S., Genomic Diversity and Evolution of Papillomaviruses in Rhesus Monkeys, *Journal of Virology* 1997;**71**:7.
- [2] Chan, S-Y, Delius, H., Halpern, A. L., and Bernard, H-U, Analysis of Genomic Sequences of 95 Papillomavirus Types: Uniting Typing, Phylogeny, and Taxonomy, *Journal of Virology* 1995;**69**:5, 3074–3083.
- [3] Meissner, J., Sequencing Errors in Reference HPV Clones, in this volume, Part III-110.
- [4] Myers, G., Lu, H., Calef, C., and Leitner, T., Heterogeneity of Papillomaviruses. *Seminars in Cancer Biology* 1997; **7**:349–358.

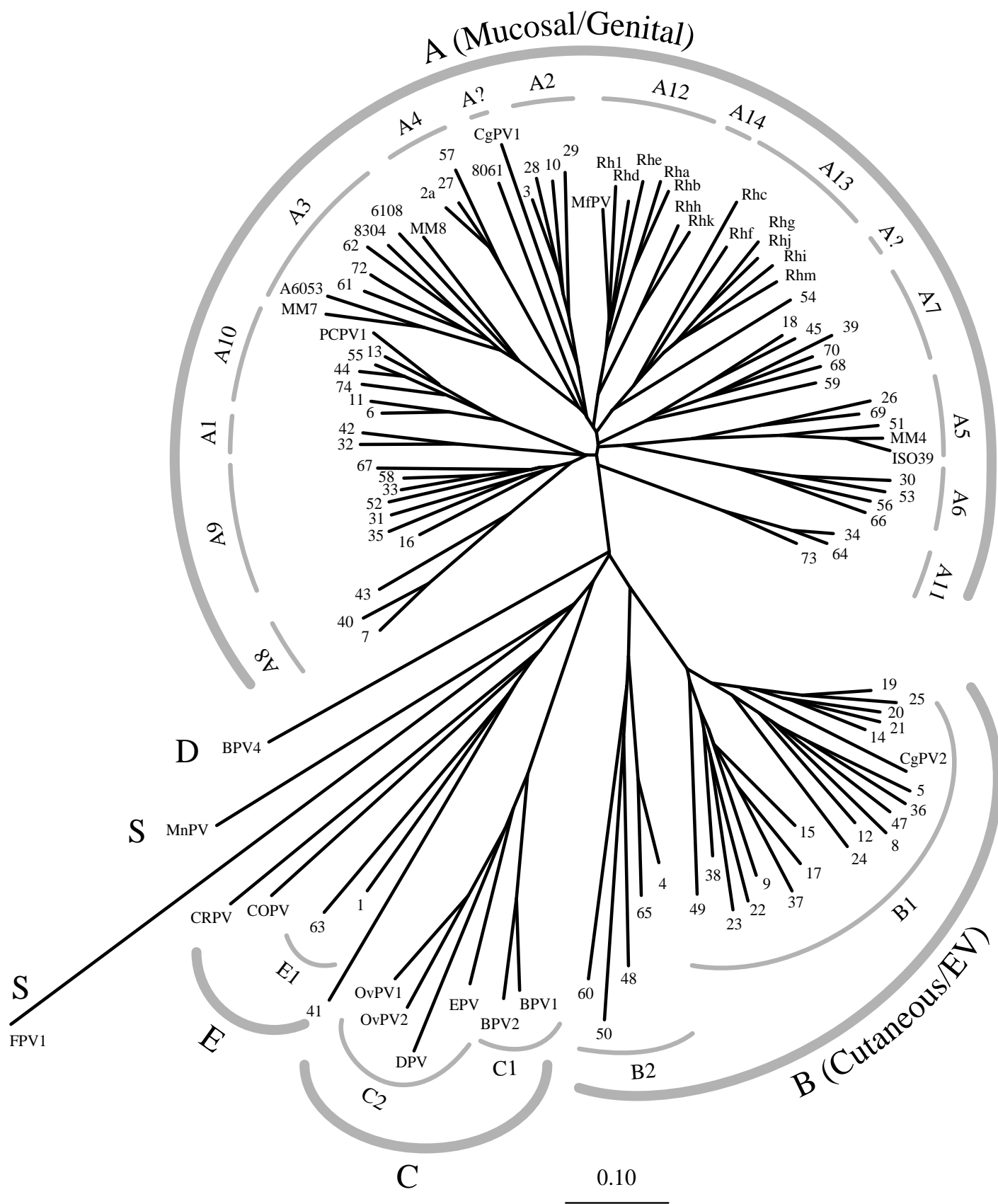


Figure 1. Neighbor joining phylogenetic tree of 106 PVs based on CPR region of L1.

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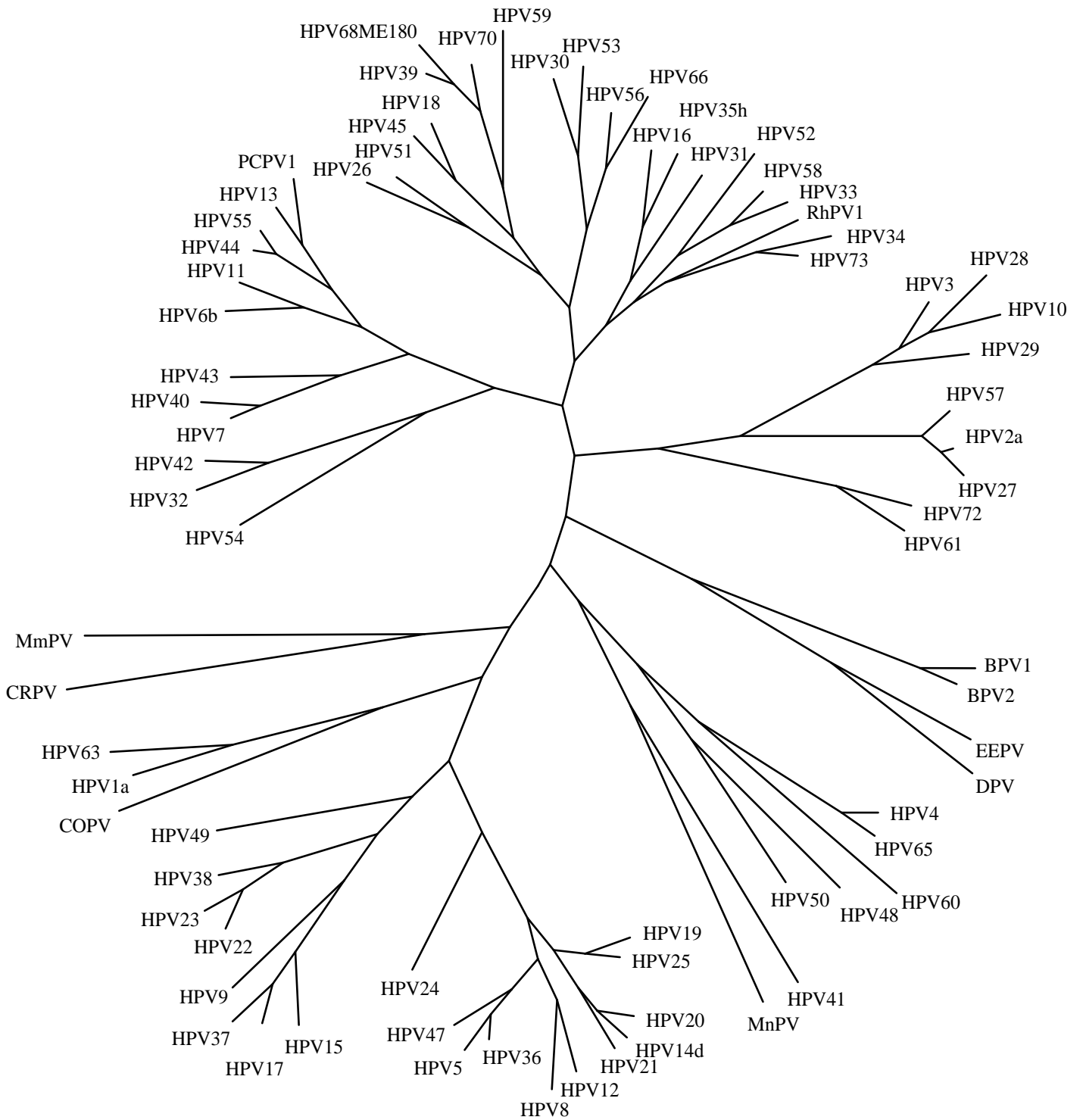


Figure 2. Inversely weighted parsimony phylogenetic tree of the E6 gene.

Table I-1 Sequence List and Cross Reference for HPV Database

## ① HUMAN PAPILLOMAVIRUSES

Type	Locus Name	“Old” Group	“New” Group	GenBank Locus Name	GenBank Accession	Region Sequenced	Page No.
✓ HPV1a*	HPV1aR	G	E1	PAPAPI	V01116	Complete	(97) I-82
	HPV2	F	A4	PAHPV2A	X55964	Complete	(94) I-F-4
	HPV3	F	A2	HPV3	X74462	Complete	(94) I-F-8
	HPV4	G	B2	PAPP4	X70827	Complete	(94) I-G-8
✓ HPV5*	HPV5R	H	B1	PPH5CG	M17463	Complete	(97) I-91
	HPV5	H	B1	PPH5BCG	D90252	Complete	(94) I-H-8
	HPV5	H	B1	PPHDELCG	M22961	Complete	(94) I-H-12
✓ HPV6*	HPV6bR	B	A10	PAPA6B	X00203	Complete	(97) I-98
	HPV7	F	A8	HPV7	X74463	Complete	(94) I-F-12
	HPV8	H	B1	PPH8CG	M12737	Complete	(94) I-H-16
	HPV9	H	B1	HPV9	X74464	Complete	(94) I-H-20
	HPV10	F	A2	HPV10	X74465	Complete	(94) I-F-16
	HPV11	B	A10	PPH11	M14119	Complete	(94) I-B-10
	HPV12	H	B1	HPV12	X74466	Complete	(94) I-H-24
	HPV13	B	A10	HPVT13DNA	X62843	Complete	(94) I-B-14
	HPV14	H	B1	HPV14D	X74467	Complete	(94) I-H-28
	HPV15	H	B1	HPV15	X74468	Complete	(94) I-H-32
	HPV16	A	A9	PPH16	K02718	Complete	(94) I-A-3
	HPV16	A	A9	?	?	Complete	(95) I-A9-56
	HPV17	H	B1	HPV17	X74469	Complete	(94) I-H-36
✓ HPV18*	HPV18R	C	A7	PAPHPV18	X05015	Complete	(97) I-105
	HPV19	H	B1	HPV19	X74470	Complete	(94) I-H-40
	HPV20	H	B1	HPU31778	U31778	Complete	(95) I-B1-174
	HPV20	H	B1	PPH20E6	D90261	E6	(94) I-H-44
	HPV20	H	B1	PPHC7C	D50547	E7	
	HPV20	H	B1	PPHL1AB	L38910	L1	
	HPV21	H	B1	HPU31779	U31779	Complete	(95) I-B1-178
	HPV21	H	B1	PPH21E6	D90263	E6	(94) I-H-46
	HPV21	H	B1	PPHE7D	D50548	E7	
	HPV21	H	B1	PPHL1AC	L38911	L1	
	HPV22	H	B1	HPU31780	U31780	Complete	(95) I-B1-182
	HPV22	H	B1	PPHL1AD	L38912	L1	
	HPV23	H	B1	HPU31781	U31781	Complete	(95) I-B1-186
	HPV23	H	B1	PPHL1AE	L38913	L1	
	HPV24	H	B1	HPU31782	U31782	Complete	(95) I-B1-190
	HPV24	H	B1	PPHL1AP	L38924	L1	
	HPV25	H	B1	HPV25	X74471	Complete	(94) I-H-48
	HPV26	D	A5	HPV26	X74472	Complete	(94) I-D-3
	HPV27	F	A4	HPV27	X74473	Complete	(94) I-F-20
	HPV28	F	A2	HPU31783	U31783	Complete	(95) I-A2-15
	HPV28	F	A2	HPU1250211	U12502	L1	(94) I-F-24
	HPV29	F	A2	HPU31784	U31784	Complete	(95) I-A2-19
	HPV29	F	A2	HPU1250311	U12503	L1	(94) I-F-25
	HPV30	D	A6	HPV30	X74474	Complete	(94) I-D-7
	HPV31	A	A9	PPH31A	J04353	Complete	(94) I-A-9
	HPV32	F	A1	HPV32	X74475	Complete	(94) I-F-26
	HPV33	A	A9	PPH33CG	M12732	Complete	(94) I-A-14

**Table I-1 (cont.) Sequence List and Cross Reference for HPV Database****① HUMAN PAPILLOMAVIRUSES (cont.)**

Type	Locus Name	“Old” Group	“New” Group	GenBank Locus Name	GenBank Accession	Region Sequenced	Page No.
HPV34	HPV34	B	A11	HPV34	X74476	Complete	(94) I-B-19
HPV35	HPV35	A	A9	PPH35CG	M74117	Complete	(94) I-A-19
HPV35	HPV35h	A	A9	HPV35H	X74477	Complete	(94) I-A-24
HPV36	HPV36	H	B1	HPU31785	U31785	Complete	(95) I-B1-194
HPV36	HPV36LCR	H	B1	HPVLCR4	X52061	LCR	
HPV36	HPV36My911	H	B1	PPHL1AG	L38915	L1	
HPV37	HPV37	H	B1	HPU31786	U31786	Complete	(95) I-B1-198
HPV38	HPV38	H	B1	HPU31787	U31787	Complete	(95) I-B1-202
HPV38	HPV38My911	H	B1	PPHL1AI	L38917	L1	
HPV39	HPV39	C	A7	PPHT39	M62849	Complete	(94) I-C-8
HPV40	HPV40	F	A8	HPV40	X74478	Complete	(94) I-F-30
HPV41	HPV41	G	E	PAP41CG	X56147	Complete	(94) I-G-12
HPV42	HPV42	F	A1	PPHPAPV42A	M73236	Complete	(94) I-F-34
HPV43	HPV43E6	F	A8	PPH43E6A	M27022	E6	(94) I-F-38
HPV43	HPV43MY911	F	A8	HPU1250411	U12504	L1	(94) I-F-39
HPV44	HPV44	B	A10	HPU31788	U31788	Complete	(95) I-A10-154
HPV44	HPV44E6	B	A10	PPH44E6A	M27023	E6	(94) I-B-23
HPV44	HPV44MY911	B	A10	HPU1249311	U12493	L1	(94) I-B-24
HPV45	HPV45	C	A7	HPV45	X74479	Complete	(94) I-C-12
HPV47	HPV47	H	B1	PPH47CG	M32305	Complete	(94) I-H-52
HPV48	HPV48	G	B2	HPU31789	U31789	Complete	(95) I-B2-224
HPV49	HPV49	H	B1	HPV49	X74480	Complete	(94) I-H-56
HPV50	HPV50	G	B2	HPU31790	U31790	Complete	(95) I-B2-227
HPV51	HPV51	D	A5	PPHDNA	M62877	Complete	(94) I-D-11
HPV52	HPV52	A	A9	HPV52	X74481	Complete	(94) I-A-29
HPV53	HPV53	D	A6	HPV53	X74482	Complete	(94) I-D-15
HPV54	HPV54	F	A	HPU37488	U37488	Complete	(95) I-A-164
HPV54	HPV54MY911	F	A	HPU1250111	U12501	L1	(94) I-F-40
HPV55	HPV55	B	A10	HPU31791	U31791	Complete	(95) I-A10-158
HPV56	HPV56	D	A6	HPV56	X74483	Complete	(94) I-D-19
HPV57	HPV57	F	A4	PAHPV57	X55965	Complete	(94) I-F-41
HPV58	HPV58	A	A9	PPH58	D90400	Complete	(94) I-A-33
HPV59	HPV59	C	A7	HPV59VG	X77858	Complete	(95) I-A7-43
HPV59	HPV59MY911	C	A7	HPU1249611	U12496	L1	(94) I-C-16
HPV59	HPV59X03	C	A7	S42987	S42987	L1	
HPV60	HPV60	G	B2	HPU31792	U31792	Complete	(95) I-B1-230
HPV61	HPV61	E	A3	HPU31793	U31793	Complete	(95) I-A3-25
HPV61	HPV61L1AE4	E	A3	HPU01534	U01534	L1	(94) I-E-2
HPV61	HPV61MY911	E	A3	HPU1250011	U12500	L1	(94) I-E-3
HPV62	HPV62MY911	E	A3	HPU1249911	U12499	L1	(94) I-E-4
HPV63	HPV63	G	E1	PAPPH63	X70828	Complete	(94) I-G-16
HPV64	HPV64MY911	B	A11	HPU1249511	U12495	L1	(94) I-B-26
HPV65	HPV65	G	B2	PAPPH65	X70829	Complete	(94) I-G-20
HPV66	HPV66	D	A6	HPU31794	U31794	Complete	(95) I-A6-36
HPV66	HPV66L1AE3	D	A6	HPU01533	U01533	L1	(94) I-D-23
HPV66	HPV66MY911	D	A6	HPU1249811	U12498	L1	(94) I-D-24
HPV66	HPV66E6E7	D	A6	PPHE6E7GEN	M75123	LCR,E6,E7	

Table I-1 (cont.) Sequence List and Cross Reference for HPV Database

## ① HUMAN PAPILOMAVIRUSES (cont.)

Type	Locus Name	“Old” Group	“New” Group	GenBank Locus Name	GenBank Accession	Region Sequenced	Page No.
HPV67	HPV67MY911	A	A9	HPU1249211	U12492	L1	(94) I-A-37
HPV68	HPV68ME180	C	A7	HUMHPVME18	M73258	LCR,E6,E7,E1,L1,L2	(94) I-C-17
HPV69	HPV69MY911	D	A5	HPU1249711	U12497	L1	(94) I-D-25
HPV70	HPV70	C	A7	HPU21941	U21941	Complete	(95) I-A7-47
HPV70	HPV70CP141	C	A7	HPU12476	U12476	L1	(94) I-C-20
HPV70	HPVL1AE1	C	A7	HPU01535	U01535	L1	(94) I-C-22
HPV70	HPV70LVX160	C	A7	HPU124860	U12486	L1	(94) I-C-23
HPV70	HPV70X11	C	A7	S42991	S42991	L1	
HPV72	HPV72	E	A3	HPVT72ELG	X94164	Complete	(96) I-15
HPV72	HPV72CP4173	E	A3	HPU124773	U12477	L1	(94) I-E-5
HPV72	HPV72LVX100	E	A3	HPU124850	U12485	L1	(94) I-E-11
HPV73	HPV73	B	A11	HPVT73ELG	X94165	Complete	(96) I-22
HPV73	HPVMM9	B	A11	HPU12491	U12491	L1	(94) I-B-27
✓ HPV74	HPV74	B	A10	HPU40822	U40822	L2,L1,LCR,E6,E7,E1	(97) I-40
HPV75	HPV75L1	H	B1	HPVS407	X79942	L1	(95) I-B1-214
HPV76	HPV76L1	H	B1	HPCR148	X79948	L1	(95) I-B1-215
HPV77	HPV77L1	F	A2	HPVS931	X79947	L1	(95) I-A2-23
?	HPVCP6108	E	A3	HPU124788	U12478	L1	(94) I-E-7
?	HPVCP8061	F	A	HPU124791	U12479	L1	(94) I-F-45
?	HPVCP8304	E	A3	HPU124804	U12480	L1	(94) I-E-9
✓ ?	HPVGA6053	E	A3	HPGA6053	Y11911	L1 CPR	(97) I-44
?	HPVICPX1	H	B1	PPHL1AF	L38914	L1	(95) I-B1-206
?	HPVIS039	D	A5	HPU12481	U12481	L1	(94) I-D-26
?	HPVL1AE2	D	A5	HPU01532	U01532	L1	(94) I-D-27
?	HPVLVX82	E	A	HPU12487	U12487	L1	(94) I-E-12
?	HPVMM4	D	A5	HPU12488	U12488	L1	(94) I-D-28
?	HPVMM7	E	A3	HPU12489	U12489	L1	(94) I-E-13
?	HPVMM8	E	A3	HPU12490	U12490	L1	(94) I-E-14
?	HPVRTRX1	H	B1	PPHL1AJ	L38918	L1	(95) I-B1-207
?	HPVRTRX2	H	B1	PPHL1AK	L38919	L1	(95) I-B1-208
?	HPVRTRX3	H	B1	PPHL1AL	L38920	L1	(95) I-B1-209
?	HPVRTRX4	H	B1	PPHL1AM	L38921	L1	(95) I-B1-210
?	HPVRTRX5	H	B1	PPHL1AN	L38922	L1	(95) I-B1-211
?	HPVRTRX6	H	B1	PPHL1AO	L38923	L1	(95) I-B1-212
✓ ?	HPVRTRX7	H	B1	HPU85660	U85660	L1 CPR	(97) I-54
✓ ?	HPVRTRX8	H	B1	HPU85661	U85661	L1 CPR	(97) I-56
✓ ?	HPVRTRX9	H	B1	HPU85662	U85662	L1 CPR	(97) I-57
✓ ?	HPVRTRX10	H	B1	HPU85663	U85663	L1 CPR	(97) I-58
?	HPVTogawa	H	B1	PPHL1FR	L38388	L1	(95) I-B1-213
✓ ?	HPVUWSA	H	B1	AF012460	AF012460	L1 CPR	(97) I-59
✓ ?	HPVUWSD	H	B1	AF012461	AF012461	L1 CPR	(97) I-60
?	HPVTogawa	H	B1	PPHL1FR	L38388	L1	(95) I-B1-213
?	HPVVS19L1	G	B2	HPDNACP1	X89876	L1	(96) I-21
?	HPVVS20L1	H	B1	HPVS204	X79941	L1	(95) I-B1-216
?	HPVVS42L1	H	B1	HPVS421	X79943	L1	(95) I-B1-217
?	HPVVS73L1	H	B1	HPVS731	X79944	L1	(95) I-B1-218
?	HPVVS75L1	H	B1	HPVS753	X79945	L1	(95) I-B1-219
?	HPVVS92L1	H	B1	HPVS921	X79949	L1	(95) I-B1-220

**Table I-1 (cont.) Sequence List and Cross Reference for HPV Database****① HUMAN PAPILLOMAVIRUSES (cont.)**

Type	Locus Name	“Old” Group	“New” Group	GenBank Locus Name	GenBank Accession	Region Sequenced	Page No.
?	HPVVS102L1	H	B1	HPVS1024	X79946	L1	(95) I-B1-221
?	HPVVS200L1	H	B1	HPDNACP2	X89877	L1	(96) I-18
?	HPVVS201L1	G	B2	HPDNACP3	X89878	L1	(96) I-22
?	HPVVS202L1	G	B2	HPDNACP4	X89879	L1	(96) I-23
?	HPVVS203L1	G	B2	HPDNACP5	X89880	L1	(96) I-24
?	HPVVS204L1	G	B2	HPDNACP6	X89881	L1	(96) I-25
?	HPVVS205L1	G	B2	HPDNACP7	X89882	L1	(96) I-26
?	HPVVS206L1	G	B2	HPDNACP8	X89883	L1	(96) I-27
?	HPVVS207L1	G	B2	HPDNACP9	X89884	L1	(96) I-28
?	HPVX06	E	A3	S42984	S42984	L1	(95) I-A3-29

**Table I-2 Sequence List and Cross Reference of 1997 Animal PV Database****② ANIMAL PAPILLOMAVIRUSES**

Type	Locus Name	“Old” Group	“New” Group	GenBank Locus Name	GenBank Accession	Region Sequenced	Page No.	
	BPV1	BPV1L1	I	C1	BPU23379	U23379	L1	
	BPV1	BPV1R	I	C1	?	?	Complete (95) I-C1-235	
	BPV1	BPV1	I	C1	PPBCG	J02044	Complete (94) I-I-23	
	BPV2	BPV2	I	C1	PPB2CG	M20219	Complete (94) I-I-28	
	BPV3	BPV3	I	D1	BP3ORF	X59062	L1,E8,E7,E1	
	BPV3	BPV3L1	I	D1	BPU21862	U21862	L1 (95) I-D1-248	
	BPV4	BPV4	I	D1	PABPV4XX	X05817	Complete (94) I-I-32	
	BPV5	BPV5L1	I	C	BPU21863	U21863	L1 (95) I-C-246	
✓	BPV5	BPV5E1E2	I	C	BPU43367	U43367	E1,E2 (97) I-62	
✓	BPV5	BPV5E7E8	I	C	BPU50841	U50841	E1,E7,E8 (97) I-64	
	BPV6	BPV6	I	D1	BP6ORF	X59064	L1,E8,E7,E1	
	BPV6	BPV6L1	I	D1	BPU21864	U21864	L1 (95) I-D1-249	
	CgPV1	CgPV1E1	I	A	MPAWART1	M64365	E1 (95) I-A-167	
	CgPV1	CgPV1L1	I	A	MPAWART2	M64366	L1 (95) I-A-168	
✓	CgPV1	CgPV1My911	I	A	CMU72629	U72629	L1 CPR (97) I-65	
✓	CgPV2	CgPV2E6L1	I	B1	CMU72630	U72630	E6,E7,L1,LCR (97) I-51	
	COPV	COPV	I	E	PPHCG	L22695	Complete (94) I-I-5	
	CRPV	CRPV	I	E	RAPRBF CG	K02708	Complete (94) I-I-9	
	CRPV	PSU09494	I	E	PSU09494	U09494	E7	
	DPV	DPV	I	C2	PPDCG	M11910	Complete (94) I-I-18	
	EEPV	EEPV	I	C2	PPECG	M15953	Complete (94) I-I-13	
	FPV1	FPV1E1	I	S	PPA11	K02019	E1 (95) I-S-256	
✓	FPV1*	FPV1L1R	I	S	{ PPA12 CPU89669	{ K02020 U89669	{ L1 L1 CPR	{ (97) I-67 (97) I-??
✓	MFPV	MfPV		A12	MFU89668	U89668	L1 CPR (97) I-38	



Table I-1 cont. Sequence List and Cross Reference for 1997 HPV Database

## ② ANIMAL PAPILLOMAVIRUSES (cont.)

Type	Locus Name	“Old” Group	“New” Group	GenBank Locus Name	GenBank Accession	Region Sequenced	Page No.
MmPV	MMPVE6	I	S	MMPVE6	X65200	E6	(95) I-S-258
MnPV	MnPV	I	S	U01834	U01834	Complete	(94) I-I-42
OvPV1	OvPV	I	C2	OPU21861	U21861	L1	(95) I-C2-241
✓ OVPV1	OvPV1	I	C2	OPU83594	U83594	Complete	(97) I-69
✓ OVPV2	OvPV2	I	C2	OPU83595	U83595	Complete	(97) I-74
PCPV1	PCPV1	I	A10	PCPVT1DNA	X62844	Complete	(94) I-I-37
ROPV	ROPVL2	I	E	RAP02	M19498	L2	
ROPV	ROPVE2L2	I	E	RAP01	M19497	E2,E4,L2	
RPV	RPVE5E9	I	C2	S74218	S74218	E9	(95) I-C2-244
RPV	RPVE5	I	C2	PPRE5A	M18176	E5	(95) I-C2-243
RPV	RPVE5B	I	C2	PPRE5A	M18176	E5	
✓ RPV1*	RPVL1R	I	C2	{ PPRE5GA CPU89679	{ M18175 RPU89669	{ L1 L1 CPR	{ (97) I-?? (97) I-79
✓ RhPV1*	RHPV1R	I	A12	RPLCG	M60184	Complete	(97) I-19
✓ ?	RhPVA	I	A12	RMU89656	U89656	L1 CPR	(97) I-26
✓ ?	RhPVB	I	A12	RMU89657	U89657	L1 CPR	(97) I-27
✓ ?	RhPVC	I	A13	RMU89658	U89658	L1 CPR	(97) I-28
✓ ?	RhPVD	I	A12	RMU89659	U89659	L1 CPR	(97) I-29
✓ ?	RhPVE	I	A12	RMU89660	U89660	L1 CPR	(97) I-30
✓ ?	RhPVF	I	A13	RMU89661	U89661	L1 CPR	(97) I-31
✓ ?	RhPVG	I	A13	RMU89662	U89662	L1 CPR	(97) I-32
✓ ?	RhPVH	I	A14	RMU89663	U89663	L1 CPR	(97) I-33
✓ ?	RhPVI	I	A13	RMU89664	U89664	L1 CPR	(97) I-34
✓ ?	RhPVJ	I	A13	RMU89665	U89665	L1 CPR	(97) I-35
✓ ?	RhPVK	I	A14	RMU89666	U89666	L1 CPR	(97) I-36
✓ ?	RhPVM	I	A13	RMU89667	U89667	L1 CPR	(97) I-37

\* Existing sequences that have been revised in this compendium.

Sequences with the symbol “{” are a composite of two sequences, the original sequence, listed first, and a second sequence obtained by extending the original sequence by primer walking to include the entire MY09/MY11 region.

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