

Supplemental Table 2.

cDNA Clones Organized by Gene Name, Other Transcript Mapping Studies, and Comparison of Temporal Class Assignment to Earlier Northern and Microarray Studies.

Viral Gene and/or Name(s)	Overlapping Clones (orientation) <sup>1</sup>	Reference and strain for other mapping data of sense transcripts	Reference and strain for other mapping data of antisense transcripts	Library in which clone(s) were isolated in this study	Temporal class assigned by microarray analysis (11)	Temporal class assigned by other northern analyses <sup>2</sup>
J1L	NR				E	
TRL1-TRL14	(See TRL/IRL region below)					
RL5A	NR	(17) AD169		E, L		L (17)
UL1	L-8-1-1 (S), pL321 (S), pL249 (S), pE10226 (S), L-7-8-1-1 (S)			E, L	E-L	
UL2	pL321 (AS), pL249 (AS), pE10226 (AS)			E, L	L	
UL3	(All in AS orientation) pL321, pL249, pE10226, pL932, pL749, L-8-10-3, pL744, pL5112, pL444, pL8211, pL724, L-10-4-13, L-7-8-1-7, L-8-1-2, pL5310, L-10-2-3, pL5316, pL5313, pE10134, pE102214, pL1036, pE101037, pE101117, pL10310, pLE631, pE101222, pE102213, pE1012111, pE1011111, pE10428, pL10-3-3, pLE631			L, E, IE	L	
UL4	(All in S orientation) pL321, pL249, pE10226, pL932, pL749, L-8-10-3, pL744, pL5112, pL444, pL8211, pL724, L-10-4-13, L-7-8-1-7, L-8-1-2, pL5310, L-10-2-3, pL5316, pL5313, pE10134, pE102214, pL1036, pE101037, pE101117, pL10310, pLE631, pE101222, pE102213, pE1012111, pE1011111, pE10428, pL10-3-3, pLE631, pL631, pL316	(12) Towne		L, E, IE	E	
UL5	(All in S orientation) pL749, L-8-10-3, pL744, pL5112, pL444, pL8211, pL724, L-10-4-13, L-7-8-1-7, L-8-1-2, pL5310, L-10-2-3, pL5316, pL5313, pE10134, pE102214, pL1036, pE101037, pE101117, pL10310, pLE631, pE101222, pE102213, pE1012111, pE1011111, pE10428, pL10-3-3, pL631, pL316, L-10-2-5, pE103122			L, E, IE	E	
UL6	(All in S orientation) pE101222, pE102213, pE1012111, pE1011111, pE10428, pL10-3-3, pL631, pL316, L-10-2-5, pE103122			L, E, IE		
UL7	NR				L	

UL8	NR				
UL9	NR				L
UL10	NR				
UL11	pE102216 (AS)			E	
UL13	pL1016 (S), pL716 (S), pE102216 (AS), pIE816 (S), pL1042 (S), pL1037 (S), pIE5311 (S)			IE, E, L	E
UL12	pL1016 (AS), pL716 (AS), pE102216 (S)			E, L	
UL14	pE104210 (S)			E	L
UL16	pIE227 (S)	(27) AD169	(27) AD169 (evidence for AS transcript overlapping UL16)	IE	E, L (27)
UL15A	NR	(11) Towne			L L (11)
UL17	pIE227 (S)			IE	E
UL18	NR				L
UL19	E-9-1-4 (S), pL636 (S)			E	
UL20	E-9-1-4 (S), pL636 (S), pIE612 (S), pIE789 (S), pIE1031 (S), IE8-7-1-1(S), pIE9-2-1 (S)			IE, E, L	
UL21A		(10) AD169			
UL21.5	IE8-7-1-1 (AS), pIE9-2-1 (AS)	(50) AD169		IE	L E-L (10)
UL22A, UL20a	IE8-7-1-1 (S), pIE9-2-1 (S) pIE526 (AS), pIE912 (AS), pIE626 (AS)	(55) AD169 (50) AD169		IE	L (50)
UL23	pIE9-2-2 (S), pL7-5-1 (AS), pL5312 (S)			IE, L	
UL24	pL3115 (AS), pL5312 (S), pL8212 (AS), pL715 (AS)			L	
UL25	pL3115 (S), pL8212 (S), pL241(S), pL757 (S), pL6414 (S), pL10311 (S), pIE811 (AS)	(5) AD169		L, IE	L (5)
UL26	pE104117 (S)	(59) AD169		E	E E-L (59)
UL27	pE104117 (S), pL551 (AS)			E, L	E
UL28	pL551 (AS)			L	L
UL29	pL551 (AS), pIE526 (S), pIE912 (S), pIE626 (S)			IE, L	L

UL30	pL551 (AS)		L		
UL31	NR	(11) Towne		L	L (11)
UL32	pL2510 (S), pL326 (S), pL246 (S), pL235 (S), pL1013 (S), pL1048 (S)	(25) AD169	L	L	
UL33	pL3212 (S), pL325 (S), pL2515 (S)	(71) AD169	L	E	L (71)
UL34	(All in S orientation) pIE5212, pIE625, pIE223, pIE224, pIE618, pIE336, pIE523, pL639, pL6212, pIE1034, pL6211	(71) AD169	IE, L	E-L	L (71)
UL35	pL533 (S), pL6410 (S)	(39) Towne	L	E	L (39)
UL35A	pL3214 (S), pL533 (S)	(39) Towne	L		E (39)
UL36	pE10422 (S), IE-9-1-1 (S), pIE521 (S), pE104114 (AS)	(32) (55) AD169 (66) AD169 (67) AD169 (68) AD169	IE, E	E	IE (66-68)
UL38		(32) (66) AD169 (67) AD169 (68) AD169			IE (66-68)
UL37	pE104114 (AS), pIE324 (S), pL6313 (S), pIE788 (S),	(67) AD169			
gpUL37	IE913 (S), pL258 (S)	(68) AD169	IE, E, L		IE (66-68)
UL39	pL5510 (AS)		L		
UL40	NR	(69) AD169		E-L	
UL41A	pL5510 (S), pL525 (S)		L	L	
UL42	pL5510 (S), IE-9-10-5 (S), pIE1012 (S), pL824 (S), L-10-4-2 (S), pL525 (S)		IE, L		
UL43	pL5510 (S), IE-9-10-5 (S), pIE1012 (S), pL824 (S), L-10-4-2 (S), pL5111 (S), pL812 (S), pE10419 (S), pL333 (S), pL525 (S)		L, IE	L	
UL44	pL5111 (S), pL812 (S), pE10419 (S), pL216 (S), pIE325 (S), L-8-2-7 (S), L-10-3-1 (S), pL552 (S), pL525 (S)	(19) Towne (20) Towne (35) Towne (44)	L, E, IE	E-L	E, L (35)
UL45	pL1044 (S)		L		

UL46	IE-9-10-16 (S)		IE	E-L	
UL47	IE-9-10-16 (AS)	(6) AD169	IE	E-L	L (24)
UL48	pL238 (AS), pL4410 (AS), pE1012115 (AS), pE1011210 (AS)	(6) AD169 (11) Towne	E, L	L	L (11)
UL48.5 UL48/UL49 UL48A	pL238 (S), pL4410 (S), pE1012115 (S), pE1011210 (S)		E, L		
UL49	pL238 (S), pL4410 (S), pE1012115 (S), pE1011210 (S), pL632 (S), pL723 (S), pE101125 (S)		E, L	E-L	
UL50	pE101125 (S)		E		
UL51	NR				
UL52	pL258 (AS), pE10135 (S), pL319 (S), pL726 (S), L-10-4-1 (S), pL5210, pL327		L	L	
UL53	pL319 (S), pL726 (S), L-10-4-1 (S), pL5210 (S), pL327, pL3111 (S)		L	E	
UL54	NR	(22) AD169 (33) AD169 (58) AD169	L	E	E (22, 33, 58)
UL55 gB	pL8210 (S), pL649 (S)	(58) AD169	L	E	E-L (58)
UL56	pL8210 (S), pL649 (S)	(9) AD169 (58) AD169	L	E	E (9, 58)
UL57 ICP8 ssDNA BP	NR	(29) AD169 (58) AD169		E	E (29, 58)
UL58	NR			E	
UL59	NR			L	
UL60	NR			L	
UL61	pL252 (AS), pL629 (AS), pL638 (AS), pL831 (AS), pE103314 (AS), pE10335 (AS), pE109512 (AS), pL7210 (AS), pL6210 (AS), pL756 (AS), pL233 (S), pL537 (S)		L, E		
UL62	pL252 (AS), pL629 (AS), pL638 (AS), pL831 (AS), pE103314 (AS), pE10335 (AS), pE109512 (AS), pL7210 (AS), pL6210 (AS), pL756 (AS), pE101124 (AS), pL937 (AS), pL233 (S), pL729 (S), pL537 (S)		L, E		

UL63	pL252 (S), pL629 (S), pL638 (S), pL831 (S), pL937 (S), pL5317 (S), pL6312 (S), pL524 (S), pE10338 (S), pE10415 (S), pL832 (S), pL754 (S), pE103314 (S), pE10335 (S), pE109512 (S), pE6210 (S), pL756 (S), pE10124 (S), pL233 (AS), pL729 (AS), pL537 (AS)		L, E	E	
UL64	pL252 (AS), pL629 (AS), pL638 (AS), pL831 (AS), pE103314 (AS), pE10335 (AS), pE109512 (AS), pL756 (AS), pE101124 (AS), pL937 (AS), pL5317 (AS), pL6312 (AS), pL524 (AS), pE10338 (AS), pE10415 (AS), pL832 (AS), pL754 (AS), pL647 (AS), pE10953 (AS), pL338 (AS), pL717 (AS), pL814 (AS), pL233 (S), pL5110 (S), pL729 (S), pL537 (S)		L, E		
UL65	pL629 (S), pL638 (S), pL831 (S), pE103314 (S), pE10335 (S), pE109512 (S), pL756 (S), pL937 (S), pL5317 (S), pL6312 (S), pL524 (S), pE10338 (S), pE10415 (S), pL832 (S), pL754 (S), pL647 (S), pE10953 (S), pL338 (S), pL717 (S), pL814 (S), pL233 (AS), pL5110 (AS), pL537 (AS)	(15) Towne (16) Towne (55) AD169	L, E		L (16)
UL66	pL629 (AS), pL638 (AS), pL831 (AS), pE103314 (S), pE10335 (S), pE109512 (S), pL756 (S), pL937 (S), pL5317 (AS), pL524 (AS), pE10338 (AS), pE10415 (AS), pL832 (AS), pL754 (AS), pL647 (AS), pE10953, pL338, pL717, pL814, L-8-1-4 (AS), pL537 (S)	(11) Towne	L, E		E-L (11)
UL67	pL629 (AS), pL638 (AS), pL831 (AS), pE103314 (AS), pE10335 (AS), pE109512 (AS), pL756 (AS), pL937 (AS), pL5317 (AS), pL524 (AS), pE10338 (AS), pE10415 (AS), pL832 (AS), pL754, pL647, pE10953 (AS), pL338 (AS), pL717 (AS), pL814 (AS), L-8-1-4 (AS), pL537 (S)		L, E	L	
UL68	pL629 (AS), pL638 (AS), pL831 (AS), pE103314 (AS), pE10335 (AS), pE109512 (AS), pL756 (AS), pL937 (AS), pL5317 (AS), pL524 (AS), pE10338 (AS), pE10415 (AS), pL832 (AS), pL754, pL647, pE10953 (AS), pL338 (AS), pL717 (AS), pL814 (AS)	(11) Towne (19) Towne (76) AD169	L, E	L	L (11)
UL69	NR			E-L	E-L (76)
UL71	pL5511 (S), pE226 (S), pL337 (S)		L, IE		
UL70	pL821 (S), pL933 (AS), pL345 (AS), pL5511 (AS)		L		
UL72	pL643 (S), pE104111 (AS), pL6311 (AS), L-10-1-4 (AS), pL5511 (AS)		L	E-L	
UL73 gN	pE104111 (S), pL6311 (S), L-10-1-4 (S), pL635 (AS)	(11) Towne	L, E	E-L	L (11)

UL74 gO	pE104111 (AS), pL6311 (AS), L-10-1-4 (AS), pL635 (S)			L, E	
UL75 gH	NR	(46) Towne			E-L
UL76	NR				
UL77	pL745 (S), pL536 (S), pL1029 (S), L10-2-7(S), pL10410 (S)			L	E
UL78	pL745 (S), pL536 (S), pL1029 (S), L10-2-7 (S), pL10410 (S), pE104110 (S), pIE322 (S)			L, E, IE	E
UL79	pL615 (AS), pL342 (AS)			L	
UL80 apnG	pL615 (S), pL342 (S)	(72) Colburn		L	
UL80.5					
UL80a	pL342 (S)	(72) Colburn		L	
UL81	pL826 (S), pL223 (S)		(7) Clinical isolate	L, IE	L
UL82	(All in S orientation) pL826, pIE527, pL223, pL234, pL225, pL244, pL555, pL226, pL711, pL959, pL6310, pL532	(45) AD169 (54) AD169	(7) Clinical isolate	L, IE	L
UL83	(All in S orientation) pL5513, pL236, pL3114, pL826, pL556, pL721, pL715, pL4112, pL215, pL1047, pL5512, pL911, pL10110, pL211, pL816, pL2512, pL722, pL711, pL959, pL6310, pL532	(45) AD169 (54) AD169		L	L
UL84	(All in S orientation) pIE610, pL753, pL5314, pL742, pL1041, pL511, pL743, pL315, pL553			L	E-L
UL85	pL1015 (S), pIE6110 (S)			IE, L	E-L
UL86	NR	(13, 53) AD169			E-L L (53)
UL87	pL339 (AS), pL2212 (AS)			L	
UL88	pL339 (AS), pL725 (S), pL2212 (AS)			L	
UL91	pL725 (S)			L	L
UL90	pL725 (S)			L	L
UL92	pL725 (S), pL2212 (AS)			L	L
UL93	pL725 (S), pL331 (S)	(74) Towne (55) AD169		L	L
UL94	pL725 (S), pL331 (S)	(74) Towne (75) Towne		L	L (75)

UL95	pIE628 (S)	(74) Towne	IE		
UL89	pL725 (AS), pL331 (AS), pL2212 (S)	(50) AD169 (74) Towne	L	E-L	E, L (50)
UL96	pIE628 (S)	(74) Towne	IE	E-L	
UL97	pIE628 (S), pL711 (S), pIE334 (S), pL231 (S), pIE918 (S), pIE925 (S), pL314 (S), pL346 (S)	(74) Towne	IE, L	E-L	
UL98	pIE628 (S), pIE334 (S), pL231 (S), pIE918 (S), pIE925 (S), pL314 (S), pL346 (S), pE103120 (S), pIE8110 (S), pE1012120 (S), pL759 (S), pL613 (S)	(1) AD169 (74) Towne	L, IE, E	E-L	L (42)
UL99	pIE628 (S), pE103120 (S), pIE8110 (S), pE1012120 (S), pL759 (S), pL613 (S)	(42) Towne (74) Towne (1) AD169	IE, E, L		L (42)
gM UL100	L-8-2-5 (S), pE102221 (S)	(37) AD169	E, L	E-L	
UL102	L-8-2-5 (AS), pL1035 (S), pL2211 (S), pL222 (AS)	(57) AD169 and Towne	L	L	E (57)
UL103	NR			L	
UL105	NR	(56) Towne		E	E (56)
UL104	NR			E	
5kb intron (spans UL111- UL106)	pL539 (S), pL3211 (S)	(11) Towne (34) AD169 (47) AD169 and Towne (50) AD169	L		IE, E, L (34, 47), L (50)
UL106	pL539 (S), pL3211 (S)		L	E-L	
UL107	pIE8112 (AS), pL727 (AS)		IE, L	L	
UL108	pIE8112 (S), pL727 (S), pIE2212 (AS)		IE, L	L	
UL109	pL748 (S), pL5211(S), pL322 (S), pL212 (S)		L	L	
UL110	pL6316 (S), pL935 (S), IE-9-1-5 (S), L-10-4-16 (S), pL748 (S), pL5211(S), pL322 (S), pL212 (S)	(11) Towne (31) AD169 (40) Towne, primate strains (51) Towne	L, IE	IE, E, L	IE, L (11)
UL111A cmvIL-10	pL2513 (S), pL539 (AS), pL3211 (AS)		L	E-L	

UL111	pL6316 (S), pL935 (S), IE-9-1-5 (S), L-10-4-16 (S), pL2513 (AS), pIE538 (AS), pL539 (S), pL3211 (S)			L, IE	L		
UL112	IE-9-10-13 (S), pIE1036 (S), pL6315 (S), IE-9-10-17 (S), pIE638 (S), pL3211 (AS)	(19) Towne (61) AD169 (77) AD169		IE, L	E		E (61)
UL114 UDG	IE-10-1-2 (S), L-8-2-2 (S), pIE834 (S)	(14) AD169		IE, L	E		
UL115	IE-10-1-2 (S), L-8-2-2 (S), pIE834 (S), pIE923 (S), pL449 (AS), pL237 (AS)	(36) Towne	(36) Authors report that only sense UL119-115 transcripts derived from the same DNA strand were detected.	IE, L			IE, L (36)
UL116	pIE834 (S), pIE923 (S), pL449 (AS), pL237 (AS)	(36) Towne		IE, L	E-L		IE, L (36)
UL117	pL3211 (S), IE-9-2-1 (S)	(36) Towne		IE, L			IE, L (36)
UL119	NR	(3) AD169 (36) Towne (50) AD169			E		E, L (10) IE, L (36)
UL120	NR						
UL121	NR						
UL122	IE-10-1-3 (S), pL718 (S), pL256 (S), pIE614 (S), pIE6310 (S), pIE1015 (S)	(28) AD169 (49) AD169 (50) AD169 (60) AD169 (63) Towne (73) AD169		IE, L	IE, L		IE (60); L (49); IE, L (50)
IE1 UL123	(All in S orientation) pIE326, pIE915, pIE817, pIE5210, pIE721, pIE714, pIE8111, pIE783, pIE813, pIE627, pIE927, pIE818, pIE815, pIE622, IE-9-1-7, IE-9-1-13, IE-9-10-15, IE-9-10-8, IE-9-1-8, IE-10-1-6, IE-9-2-9, pIE814, pIE639, pIE634, pIE333, IE-9-10-4, pIE724, pIE335, IE-10-1-7, IE-10-1-5, IE-9-2-8, IE-9-10-10, pIE535, pIE2210, pIE613, pIE528, pIE836, pE1012215, IE-9-2-5, IE-10-1-8, IE-9-2-7	(2) AD169 (4) AD169 (49) AD169 (60) AD169 (63) Towne (64) Towne	(30) Clinical isolate	IE, E	IE		IE (60)
UL124	NR				E		
UL125	NR						
UL126	NR						
UL127	NR	(41) Towne	(41) Towne (evidence for AS upstream of UL127)				
UL128	pL1045 (S), pL247 (S), pIE531 (S), pL5212 (S)	(43) Towne		L, IE	E		E (43)



UL129	pL1045 (S), pL247 (S), pIE531 (S), pL5212 (S)		L, IE	L	
UL130	pL1045 (S), pL247 (S), pIE531 (S), pL5212 (S)		L, IE	E-L	
UL131A	pL1045 (S), pL247 (S), pIE531 (S), pL5212 (S)		L, IE	L	
UL132	(All in S orientation) pE101218, pL518, pL5318, L-10-4-15, pL443, pL523, pL413, pL713, L-10-1-8		L, E	E-L	
UL148	(All in S orientation) pE101218, pL518, pL5318, L-10-4-15, pL443, pL523, pL413, pL713, L-10-1-8		L, E		
J11	NR			E	
TRL14 IRL14	L-7-8-1-4 (S)		L	E, L	
TRL13 IRL13	pL443 (S), pL523 (S), pL413 (S), pL713 (S), L-7-8-1-4 (S)	(79) AD169	L	E-L	
TRL12 IRL12	NR			E-L	
TRL11 IRL11	L-8-1-5 (AS), pL811 (AS)	(3) AD169	L	L	
TRL10 IRL10	L-8-1-5 (AS)		L	E-L	
TRL9 IRL9	L-8-1-5 (AS), pL811 (AS), pE101213 (AS)	(11) Towne	L, E	L	
TRL8 IRL8	(All in AS orientation) pL417, pL227, L-8-10-5, L-10-4-17, pIE823, L-10-3-6, L-10-4-8, L-10-1-13, L10-1-6, L-10-4-5, pL717, pL1711, L-8-1-5, pL811, pE101213	(11) Towne	L, E	L	L (11)
TRL7 IRL7	(All in S orientation) pL417, pL227, L-8-10-5, L-10-4-17, pIE823, L-10-3-6, L-10-4-8, L-10-1-13, L-10-1-6, L-10-4-5, pL255, L-8-1-5, pE101213, L-8-1-5, pL811, pE101213, pL1711, pL717	(55) AD169	L, IE	E	L (11)
TRL6 IRL6	NR	(17) AD169		L	L (17)
TRL4 IRL4	(Clones in S orientation): pE101350, pL344, pE10222, E-8-2-5, pL6314, pE101121, pL348, pL828, pE10414, pL446, pE104116, pE1033318, pE1012220, pE10319, pE109511, pE10218, pL559, pL441, L-8-1-3, pE1011215, pL519, pL825, pE103312, pL7111, pE1012119, pE102218, pE102212, pE10325, AND 141 clones in transcript group 148 (see suppl. table 1). (Clones in AS orientation): pE103210, pE1012213, pE101032	(18) Davis (19) Towne (50) AD169 (70) Towne (78) AD169	E, L	E	E, L (50)

TRL5 IRL5	(All in AS orientation) pE109511, pE10218, pL559, pL519, pL825, pE103312, pL7111, pE1012119, pE10325, AND 141 clones in transcript group 148 (see suppl. table 1).			E, L
IRL3 RL3	(Clones in S orientation): pE104119, pE103210, pE1012213, pE101032, pL328, pE1211, pE1012129 (Clones in AS orientation): pE10135, pL344, pE10222, E-8-2-5, pL6314, pE101121, pL348, pL828, pE10414, pL446, pE104116, pE1033318, pE1012220, pL827, pL448, L-10-1-5, pE1011211, pE10336, L-10-4-3, pE1012150, pE10331, pE10224, L-10-4-14, pE101221, L-10-3-2, pE10136, pE10122, pL213, pL445, L-10-4-11, pE10319, pE102212, pL245, pL441, L-8-1-3, pE1011215, E-9-1-3, E-8-2-6, E-8-2-2, pE102218, pE10325 AND 141 clones in transcript group 148 (see suppl. table 1).			E, L L
IRL2	pE101127 (S), pE103310 (S), pE103213 (S), pE10229, E-8-2-1 (S), pL719 (S), pE10138 (AS), pE10225 (AS), L-10-3-5 (AS), pE10127 (AS), pL332 (AS), L-10-4-10 (AS), E-9-1-2 (AS), pE10332 (AS), pE1012110 (AS), pE101114 (AS), pE104118 (AS), pE101129 (AS), L-10-3-4 (AS), L-10-1-9 (AS), pE1012112 (AS), pE101228 (AS), pE101216 (AS)			E, L E
RL1 IRL1	pE101127 (S)			E
J11	NR			
IRS1	pE1012117 (S), pE101316 (S), pIE934 (S), pL645 (AS)	(52) AD169		E, IE
US1	pE1012117 (AS), pE101316 (AS), pIE934 (AS)			E, IE
US2	NR			
US3	IE10-1-4 (S), pIE534 (S), pIE536 (S), pIE931 (S), pIE1013 (S)	(8) Towne (38) Towne (55) AD169 (67) AD169 (50) AD169 (26) AD169		IE IE IE (8, 67); IE, E (50)
US4	pL718 (AS), pL712 (AS)			L
US5	pL718 (AS), pL712 (AS)			L
US6	pL718 (S), pL712 (S)	(26) AD169		L E-L E-L (26)
US7	NR	(26) AD169		E-L E-L, L (26)

US8	pE101116 (S), pE1012216 (S), pL612 (S)	(26) AD169		E, L	E	E (26)
US9	pE101116 (S), pE1012216 (S), pL612 (S)	(26) AD169		E, L	E	E (26)
US10	pE101215 (S)	(26) AD169		E	E	E (26)
US11	pE101215 (S)	(26) AD169		E	E	E (26)
US12	NR				E	
US13	pIE833 (S), pE10329 (S), pL7112 (S)			IE, E, L	E	
US14	pE10329 (S), pL7112 (S), pE10427 (S), pL1032 (S), pL7411 (S), pL752 (S)			L, E, IE	E	
US15	pE10427 (S), pL1032 (S), pL7411 (S), pL752 (S)			L, E	E-L	
US16	NR				E	
US17	NR				E	
US18	pL10-4-18 (S), pL516 (S)	(21) Towne	(21) Authors report that no antisense transcripts were found in the US18-20 region.	L	E	E, L (21)
US19	pE1011212 (S), pE10132 (S), pE103217 (S)	(21) Towne		E	E	E, L (21)
US20	pE1011212 (S), pE10132 (S), pE103217 (S)	(21) Towne		E	E	E, L (21)
US21	NR					
US22	pIE717 (S), pL831 (S)			IE, L	E	
US23	pL412 (S)			L	E	
US24	pL412 (S)			L	E	
US25	NR				E-L	
US26	NR				E	
US27	pL415 (S)	(71) AD169		L	E	L (71)
US28	pL1011113 (S), pE1012113 (S), pE101035 (S)	(71) AD169		E, L	E	L (71)
US29	L-824 (AS), pE103112 (AS), pL521 (AS)			L, E	E-L	
US30	L-824 (AS), pE103112 (AS)			E, L	E	
US31	pE103112 (AS)			E		
US32	pL719 (S), pL521 (AS)			L	L	
US34	pE101035 (S), pE1032118 (S), pIE713 (S), pIE624 (S), pIE229 (S)	(55) AD169		IE, E	E	
US34A	pE1032118 (S), pIE713 (S), pIE624 (S), pIE229 (S)					

US33	pE101035 (AS), pL719 (AS), pL521 (S), pE1032118 (AS), pIE713 (AS)		IE, E, L	E
US35	pE1032118 (AS), pIE713 (AS), pIE624 (AS), pIE229 (AS)	(11) Towne	IE, E	E (11)
US36	NR			
TRS1	pL645 (AS), pL317 (S)	(62)Towne (52) AD169	L	IE (62)
J1S	pL645 (AS)		L	
oriLyt-associated vRNA1, vRNA2, SRT	NR	(48) AD169 (23) AD169		SRT, E (23)

<sup>1</sup> Clones representing all or part of the gene sequences are included; NR, not represented in these libraries.

<sup>2</sup> References listed here include only those studies which ascertained temporal class according to definitions established with the use of protein synthesis and DNA synthesis drug inhibitors.

1. **Adam, B. L., T. Y. Jerve, C. P. Kohler, G. L. Wright, Jr., J. A. Nelson, and R. M. Stenberg.** 1995. The human cytomegalovirus UL98 gene transcription unit overlaps with the pp28 true late gene (UL99) and encodes a 58-kilodalton early protein. *J Virol* **69**:5304-10.
2. **Akrigg, A., G. W. Wilkinson, and J. D. Oram.** 1985. The structure of the major immediate early gene of human cytomegalovirus strain AD169. *Virus Res* **2**:107-21.
3. **Atalay, R., A. Zimmermann, M. Wagner, E. Borst, C. Benz, M. Messerle, and H. Hengel.** 2002. Identification and expression of human cytomegalovirus transcription units coding for two distinct Fcγ receptor homologs. *J Virol* **76**:8596-608.
4. **Awasthi, S., J. A. Isler, and J. C. Alwine.** 2004. Analysis of splice variants of the immediate-early 1 region of human cytomegalovirus. *J Virol* **78**:8191-200.
5. **Battista, M. C., G. Bergamini, M. C. Boccuni, F. Campanini, A. Ripalti, and M. P. Landini.** 1999. Expression and characterization of a novel structural protein of human cytomegalovirus, pUL25. *J Virol* **73**:3800-9.
6. **Bechtel, J. T., and T. Shenk.** 2002. Human cytomegalovirus UL47 tegument protein functions after entry and before immediate-early gene expression. *J Virol* **76**:1043-50.
7. **Bego, M., J. Maciejewski, S. Khaiboullina, G. Pari, and S. St Jeor.** 2005. Characterization of an antisense transcript spanning the UL81-82 locus of human cytomegalovirus. *J Virol* **79**:11022-34.
8. **Biegelke, B. J.** 1995. Regulation of human cytomegalovirus US3 gene transcription by a cis-repressive sequence. *J Virol* **69**:5362-7.
9. **Bogner, E., M. Reschke, B. Reis, T. Mockenhaupt, and K. Radsak.** 1993. Identification of the gene product encoded by ORF UL56 of the human cytomegalovirus genome. *Virology* **196**:290-3.
10. **Boriskin, Y. S., and P. D. Butcher.** 2001. Human cytomegalovirus UL21.5 gene is expressed as an "early-late" gene in cultured human fibroblasts. *Acta Virol* **45**:185-9.

11. **Chambers, J., A. Angulo, D. Amaratunga, H. Guo, Y. Jiang, J. S. Wan, A. Bittner, K. Frueh, M. R. Jackson, P. A. Peterson, M. G. Erlander, and P. Ghazal.** 1999. DNA microarrays of the complex human cytomegalovirus genome: profiling kinetic class with drug sensitivity of viral gene expression. *J Virol* **73**:5757-66.
12. **Chang, C. P., C. L. Malone, and M. F. Stinski.** 1989. A human cytomegalovirus early gene has three inducible promoters that are regulated differentially at various times after infection. *J Virol* **63**:281-90.
13. **Chee, M., S. A. Rudolph, B. Plachter, B. Barrell, and G. Jahn.** 1989. Identification of the major capsid protein gene of human cytomegalovirus. *J Virol* **63**:1345-53.
14. **Courcelle, C. T., J. Courcelle, M. N. Prichard, and E. S. Mocarski.** 2001. Requirement for uracil-DNA glycosylase during the transition to late-phase cytomegalovirus DNA replication. *J Virol* **75**:7592-601.
15. **Davis, M. G., and E. S. Huang.** 1985. Nucleotide sequence of a human cytomegalovirus DNA fragment encoding a 67-kilodalton phosphorylated viral protein. *J Virol* **56**:7-11.
16. **Davis, M. G., E. C. Mar, Y. M. Wu, and E. S. Huang.** 1984. Mapping and expression of a human cytomegalovirus major viral protein. *J Virol* **52**:129-35.
17. **Davison, A. J., P. Akter, C. Cunningham, A. Dolan, C. Addison, D. J. Dargan, A. F. Hassan-Walker, V. C. Emery, P. D. Griffiths, and G. W. Wilkinson.** 2003. Homology between the human cytomegalovirus RL11 gene family and human adenovirus E3 genes. *J Gen Virol* **84**:657-63.
18. **Demarchi, J. M.** 1981. Human cytomegalovirus DNA: restriction enzyme cleavage maps and map locations for immediate-early, early, and late RNAs. *Virology* **114**:23-38.
19. **Gawn, J. M., and R. F. Greaves.** 2002. Absence of IE1 p72 protein function during low-multiplicity infection by human cytomegalovirus results in a broad block to viral delayed-early gene expression. *J Virol* **76**:4441-55.
20. **Geballe, A. P., F. S. Leach, and E. S. Mocarski.** 1986. Regulation of cytomegalovirus late gene expression: gamma genes are controlled by posttranscriptional events. *J Virol* **57**:864-74.
21. **Guo, Y. W., and E. S. Huang.** 1993. Characterization of a structurally tricistronic gene of human cytomegalovirus composed of U(s)18, U(s)19, and U(s)20. *J Virol* **67**:2043-54.
22. **Heilbronn, R., G. Jahn, A. Burkle, U. K. Freese, B. Fleckenstein, and H. zur Hausen.** 1987. Genomic localization, sequence analysis, and transcription of the putative human cytomegalovirus DNA polymerase gene. *J Virol* **61**:119-24.
23. **Huang, L., Y. Zhu, and D. G. Anders.** 1996. The variable 3' ends of a human cytomegalovirus oriLyt transcript (SRT) overlap an essential, conserved replicator element. *J Virol* **70**:5272-81.
24. **Hyun, J. J., H. S. Park, K. H. Kim, and H. J. Kim.** 1999. Analysis of transcripts expressed from the UL47 gene of human cytomegalovirus. *Arch Pharm Res* **22**:542-8.
25. **Jahn, G., T. Kouzarides, M. Mach, B. C. Scholl, B. Plachter, B. Traupe, E. Preddie, S. C. Satchwell, B. Fleckenstein, and B. G. Barrell.** 1987. Map position and nucleotide sequence of the gene for the large structural phosphoprotein of human cytomegalovirus. *J Virol* **61**:1358-67.
26. **Jones, T. R., and V. P. Muzithras.** 1991. Fine mapping of transcripts expressed from the US6 gene family of human cytomegalovirus strain AD169. *J Virol* **65**:2024-36.
27. **Kaye, J., H. Browne, M. Stoffel, and T. Minson.** 1992. The UL16 gene of human cytomegalovirus encodes a glycoprotein that is dispensable for growth in vitro. *J Virol* **66**:6609-15.
28. **Kerry, J. A., A. Sehgal, S. W. Barlow, V. J. Cavanaugh, K. Fish, J. A. Nelson, and R. M. Stenberg.** 1995. Isolation and characterization of a low-abundance splice variant from the human cytomegalovirus major immediate-early gene region. *J Virol* **69**:3868-72.

29. **Kiehl, A., L. Huang, D. Franchi, and D. G. Anders.** 2003. Multiple 5' ends of human cytomegalovirus UL57 transcripts identify a complex, cycloheximide-resistant promoter region that activates oriLyt. *Virology* **314**:410-22.
30. **Kondo, K., and E. S. Mocarski.** 1995. Cytomegalovirus latency and latency-specific transcription in hematopoietic progenitors. *Scand J Infect Dis Suppl* **99**:63-7.
31. **Kotenko, S. V., S. Sacconi, L. S. Izotova, O. V. Mirochnitchenko, and S. Pestka.** 2000. Human cytomegalovirus harbors its own unique IL-10 homolog (cmvIL-10). *Proc Natl Acad Sci U S A* **97**:1695-700.
32. **Kouzarides, T., A. T. Bankier, S. C. Satchwell, E. Preddy, and B. G. Barrell.** 1988. An immediate early gene of human cytomegalovirus encodes a potential membrane glycoprotein. *Virology* **165**:151-64.
33. **Kouzarides, T., A. T. Bankier, S. C. Satchwell, K. Weston, P. Tomlinson, and B. G. Barrell.** 1987. Sequence and transcription analysis of the human cytomegalovirus DNA polymerase gene. *J Virol* **61**:125-33.
34. **Kulesza, C. A., and T. Shenk.** 2004. Human cytomegalovirus 5-kilobase immediate-early RNA is a stable intron. *J Virol* **78**:13182-9.
35. **Leach, F. S., and E. S. Mocarski.** 1989. Regulation of cytomegalovirus late-gene expression: differential use of three start sites in the transcriptional activation of ICP36 gene expression. *J Virol* **63**:1783-91.
36. **Leatham, M. P., P. R. Witte, and M. F. Stinski.** 1991. Alternate promoter selection within a human cytomegalovirus immediate-early and early transcription unit (UL119-115) defines true late transcripts containing open reading frames for putative viral glycoproteins. *J Virol* **65**:6144-53.
37. **Lehner, R., H. Meyer, and M. Mach.** 1989. Identification and characterization of a human cytomegalovirus gene coding for a membrane protein that is conserved among human herpesviruses. *J Virol* **63**:3792-800.
38. **Liu, W., Y. Zhao, and B. Biegelke.** 2002. Analysis of human cytomegalovirus US3 gene products. *Virology* **301**:32-42.
39. **Liu, Y., and B. J. Biegelke.** 2002. The human cytomegalovirus UL35 gene encodes two proteins with different functions. *J Virol* **76**:2460-8.
40. **Lockridge, K. M., S. S. Zhou, R. H. Kravitz, J. L. Johnson, E. T. Sawai, E. L. Blewett, and P. A. Barry.** 2000. Primate cytomegaloviruses encode and express an IL-10-like protein. *Virology* **268**:272-80.
41. **Lundquist, C. A., J. L. Meier, and M. F. Stinski.** 1999. A strong negative transcriptional regulatory region between the human cytomegalovirus UL127 gene and the major immediate-early enhancer. *J Virol* **73**:9039-52.
42. **Martinez, J., R. S. Lahijani, and S. C. St Jeor.** 1989. Analysis of a region of the human cytomegalovirus (AD169) genome coding for a 25-kilodalton virion protein. *J Virol* **63**:233-41.
43. **Meier, J. L., and M. F. Stinski.** 1997. Effect of a modulator deletion on transcription of the human cytomegalovirus major immediate-early genes in infected undifferentiated and differentiated cells. *J Virol* **71**:1246-55.
44. **Mocarski, E. S., L. Pereira, and N. Michael.** 1985. Precise localization of genes on large animal virus genomes: use of lambda gt11 and monoclonal antibodies to map the gene for a cytomegalovirus protein family. *Proc Natl Acad Sci U S A* **82**:1266-70.
45. **Nowak, B., A. Gmeiner, P. Sarnow, A. J. Levine, and B. Fleckenstein.** 1984. Physical mapping of human cytomegalovirus genes: identification of DNA sequences coding for a virion phosphoprotein of 71 kDa and a viral 65-kDa polypeptide. *Virology* **134**:91-102.
46. **Pachl, C., W. S. Probert, K. M. Hermsen, F. R. Masiarz, L. Rasmussen, T. C. Merigan, and R. R. Spaete.** 1989. The human cytomegalovirus strain Towne glycoprotein H gene encodes glycoprotein p86. *Virology* **169**:418-26.
47. **Plachter, B., B. Traupe, J. Albrecht, and G. Jahn.** 1988. Abundant 5 kb RNA of human cytomegalovirus without a major translational reading frame. *J Gen Virol* **69 (Pt 9)**:2251-66.
48. **Prichard, M. N., S. Jairath, M. E. Penfold, S. St Jeor, M. C. Bohlman, and G. S. Pari.** 1998. Identification of persistent RNA-DNA hybrid structures within the origin of replication of human cytomegalovirus. *J Virol* **72**:6997-7004.

49. **Puchtler, E., and T. Stamminger.** 1991. An inducible promoter mediates abundant expression from the immediate-early 2 gene region of human cytomegalovirus at late times after infection. *J Virol* **65**:6301-6.
50. **Rawlinson, W. D., and B. G. Barrell.** 1993. Spliced transcripts of human cytomegalovirus. *J Virol* **67**:5502-13.
51. **Razzaque, A., N. Jahan, D. McWeeney, R. J. Jariwalla, C. Jones, J. Brady, and L. J. Rosenthal.** 1988. Localization and DNA sequence analysis of the transforming domain (mtrII) of human cytomegalovirus. *Proc Natl Acad Sci U S A* **85**:5709-13.
52. **Romanowski, M. J., and T. Shenk.** 1997. Characterization of the human cytomegalovirus *irs1* and *trs1* genes: a second immediate-early transcription unit within *irs1* whose product antagonizes transcriptional activation. *J Virol* **71**:1485-96.
53. **Rudolph, S. A., T. Stamminger, and G. Jahn.** 1990. Transcriptional analysis of the eight-kilobase mRNA encoding the major capsid protein of human cytomegalovirus. *J Virol* **64**:5167-72.
54. **Ruger, B., S. Klages, B. Walla, J. Albrecht, B. Fleckenstein, P. Tomlinson, and B. Barrell.** 1987. Primary structure and transcription of the genes coding for the two virion phosphoproteins pp65 and pp71 of human cytomegalovirus. *J Virol* **61**:446-53.
55. **Scott, G. M., B. G. Barrell, J. Oram, and W. D. Rawlinson.** 2002. Characterisation of transcripts from the human cytomegalovirus genes TRL7, UL20a, UL36, UL65, UL94, US3 and US34. *Virus Genes* **24**:39-48.
56. **Smith, J. A., S. Jairath, J. J. Crute, and G. S. Pari.** 1996. Characterization of the human cytomegalovirus UL105 gene and identification of the putative helicase protein. *Virology* **220**:251-5.
57. **Smith, J. A., and G. S. Pari.** 1995. Human cytomegalovirus UL102 gene. *J Virol* **69**:1734-40.
58. **Smuda, C., E. Bogner, and K. Radsak.** 1997. The human cytomegalovirus glycoprotein B gene (ORF UL55) is expressed early in the infectious cycle. *J Gen Virol* **78 (Pt 8)**:1981-92.
59. **Stamminger, T., M. Gstaiger, K. Weinzierl, K. Lorz, M. Winkler, and W. Schaffner.** 2002. Open reading frame UL26 of human cytomegalovirus encodes a novel tegument protein that contains a strong transcriptional activation domain. *J Virol* **76**:4836-47.
60. **Stamminger, T., E. Puchtler, and B. Fleckenstein.** 1991. Discordant expression of the immediate-early 1 and 2 gene regions of human cytomegalovirus at early times after infection involves posttranscriptional processing events. *J Virol* **65**:2273-82.
61. **Staprans, S. I., and D. H. Spector.** 1986. 2.2-kilobase class of early transcripts encoded by cell-related sequences in human cytomegalovirus strain AD169. *J Virol* **57**:591-602.
62. **Stasiak, P. C., and E. S. Mocarski.** 1992. Transactivation of the cytomegalovirus ICP36 gene promoter requires the alpha gene product TRS1 in addition to IE1 and IE2. *J Virol* **66**:1050-8.
63. **Stenberg, R. M., A. S. Depto, J. Fortney, and J. A. Nelson.** 1989. Regulated expression of early and late RNAs and proteins from the human cytomegalovirus immediate-early gene region. *J Virol* **63**:2699-708.
64. **Stenberg, R. M., D. R. Thomsen, and M. F. Stinski.** 1984. Structural analysis of the major immediate early gene of human cytomegalovirus. *J Virol* **49**:190-9.
65. **Su, Y., J. R. Testaverde, C. N. Davis, W. A. Hayajneh, R. Adair, and A. M. Colberg-Poley.** 2003. Human cytomegalovirus UL37 immediate early target minigene RNAs are accurately spliced and polyadenylated. *J Gen Virol* **84**:29-39.
66. **Tenney, D. J., and A. M. Colberg-Poley.** 1991. Expression of the human cytomegalovirus UL36-38 immediate early region during permissive infection. *Virology* **182**:199-210.
67. **Tenney, D. J., and A. M. Colberg-Poley.** 1991. Human cytomegalovirus UL36-38 and US3 immediate-early genes: temporally regulated expression of nuclear, cytoplasmic, and polysome-associated transcripts during infection. *J Virol* **65**:6724-34.
68. **Tenney, D. J., and A. M. Colberg-Poley.** 1990. RNA analysis and isolation of cDNAs derived from the human cytomegalovirus immediate-early region at 0.24 map units. *Intervirology* **31**:203-14.

69. **Ulbrecht, M., S. Martinozzi, M. Grzeschik, H. Hengel, J. W. Ellwart, M. Pla, and E. H. Weiss.** 2000. Cutting edge: the human cytomegalovirus UL40 gene product contains a ligand for HLA-E and prevents NK cell-mediated lysis. *J Immunol* **164**:5019-22.
70. **Wathen, M. W., and M. F. Stinski.** 1982. Temporal patterns of human cytomegalovirus transcription: mapping the viral RNAs synthesized at immediate early, early, and late times after infection. *J Virol* **41**:462-77.
71. **Welch, A. R., L. M. McGregor, and W. Gibson.** 1991. Cytomegalovirus homologs of cellular G protein-coupled receptor genes are transcribed. *J Virol* **65**:3915-8.
72. **Welch, A. R., L. M. McNally, and W. Gibson.** 1991. Cytomegalovirus assembly protein nested gene family: four 3'-coterminally transcribed transcripts encode four in-frame, overlapping proteins. *J Virol* **65**:4091-100.
73. **Weston, K.** 1988. An enhancer element in the short unique region of human cytomegalovirus regulates the production of a group of abundant immediate early transcripts. *Virology* **162**:406-16.
74. **Wing, B. A., and E. S. Huang.** 1995. Analysis and mapping of a family of 3'-coterminally transcribed transcripts containing coding sequences for human cytomegalovirus open reading frames UL93 through UL99. *J Virol* **69**:1521-31.
75. **Wing, B. A., G. C. Lee, and E. S. Huang.** 1996. The human cytomegalovirus UL94 open reading frame encodes a conserved herpesvirus capsid/tegument-associated virion protein that is expressed with true late kinetics. *J Virol* **70**:3339-45.
76. **Winkler, M., S. A. Rice, and T. Stamminger.** 1994. UL69 of human cytomegalovirus, an open reading frame with homology to ICP27 of herpes simplex virus, encodes a transactivator of gene expression. *J Virol* **68**:3943-54.
77. **Wright, D. A., and D. H. Spector.** 1989. Posttranscriptional regulation of a class of human cytomegalovirus phosphoproteins encoded by an early transcription unit. *J Virol* **63**:3117-27.
78. **Wu, T. C., W. A. Lee, M. C. Pizzorno, W. C. Au, Y. J. Chan, R. H. Hruban, G. M. Hutchins, and G. S. Hayward.** 1992. Localization of the human cytomegalovirus 2.7-kb major early beta-gene transcripts by RNA in situ hybridization in permissive and nonpermissive infections. *Am J Pathol* **141**:1247-54.
79. **Yu, D., G. A. Smith, L. W. Enquist, and T. Shenk.** 2002. Construction of a self-excisable bacterial artificial chromosome containing the human cytomegalovirus genome and mutagenesis of the diploid TRL/IRL13 gene. *J Virol* **76**:2316-28.