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Virology 50th Anniversary Special Issue: A Publisher's Note

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Abstract

A Publishers Note introduces this special issue, commemorating *Virology's* 50th birthday, with a look back at its prestigious history, and the scientific progress that has been made in the field since the launch of the journal in 1954. It provides a list of the top 100 most-cited papers published in the journal to date.

Last month saw the close of 2005, the year in which *Virology* celebrated 50 years of publishing key research in the field. This important event was signaled by the 50th anniversary logo on the journal cover throughout the year, a beautiful special edition calendar, and an editorial board party during the American Society for Virology meeting at Penn State University last June. To complete our celebrations and to provide a more lasting commemoration, this special issue marks this prestigious occasion by publishing a range of exciting Reviews from Editors of the journal, Editorial Board members, and key figures in the field. The diversity and quality of these Reviews are outstanding, and I would like to thank everyone who participated so enthusiastically, for their contributions.

Looking back, the first issue of *Virology* was published in May 1954 and contained only 139 pages. In the intervening 50 years, *Virology* has grown and developed, covering burgeoning scientific areas, and publishing research articles at the cutting edge of the discipline. It has also grown in size, from its initial 6 bimonthly issues per year to 26 biweekly issues (many of which have been over 400 pages). Its pages have chronicled many of the advances that have been made in our collective knowledge and understanding of a field of study that is both fascinating intellectually and of vital importance in its human and economic impact.

When the first issue of *Virology* was published in 1954, George K. Hirst presided as Editor in Chief, and L.M. Black and S.E. Luria acted as the main Editors. At that time, it was only 9 years since Salvador Luria and Alfred Hershey had demonstrated that bacteriophages mutate. Just 4 years beforehand, in 1950, André Lwoff, Louis Siminovitch, and Niels Kjeldgaard discovered lysogenic bacteriophage in *Bacillus megaterium* and coined the term prophage. In 1952, Renato Dulbecco demonstrated that animal viruses can form plaques in a similar way to bacteriophages, and in the same year, Alfred Hershey and Martha Chase showed that DNA was the genetic material of a bacteriophage. It was in this scientific environment that *Virology* was 'born' and became the first general journal in the field. It was a time in which the basic foundations were being laid, and it conjures a reminder that it is "strange how much you've got to know before you know how little you know" (Anon).

The 1950s and 1960s were the formative years for virology. In the year that *Virology* was launched, John Enders, Thomas Weller, and Frederick Robbins won the Nobel Prize for their work in growing poliovirus *in vitro* using human tissue culture, perhaps one of the most significant single events in the development of diagnostic virology. Many of the important achievements in the field were recognized with Nobel prizes, and virology can certainly claim to be ranked extraordinarily highly among scientific disciplines with the most frequent awards, with over 10 prizes to date directly relating to discoveries in virology, plus 2 relating to prions, awarded to 17 individuals.

Following George K. Hirst as Editor in Chief was Bill Joklik, who honors us with an article in this issue describing

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the founding of the American Society for Virology. The present Editor in Chief, Robert Lamb, took over from Bill in 1994 and is therefore only the third to hold this role since the journal began. Over the years, the journal has been supported by its Editors, strengthened by their work and passionate involvement, and broadened and stimulated by their ideas. There are too many whose involvement we have enjoyed over the years to name, but readers may be interested to learn that for the first issue, apart from George K. Hirst, L.M. Black, and S.E. Luria, the Associate Editors were listed as C.H. Andrews, C.A. Brandly, Seymour S. Cohen, A.H. Doermann, John F. Enders, Charles A. Evans, Werner Henle, A.D. Hershey, Francis O. Holmes, Frank L. Horsfall Jr, Hilary Koprowski, André Lwoff, James W. Moulder, Glenn S. Pound, Theodore T. Puck, A.F. Ross, H.K. Schachman, Edward A. Steinhaus, Robley C. Williams, and C.E. Yarwood.

Throughout this last half century, scientists and clinicians have submitted their best work to the journal, and we are proud to have published excellent work from scientists from around the world. Indeed, its achievements have only been possible through the intellectual input, hard work, dedication, and support of key figures in the field, who have devoted their time and energy to ensure that *Virology* continues to be one of the best vehicles for the dissemination of quality research. Their involvement as Editors, Editorial Board members, reviewers, and authors is gratefully acknowledged.

Since the launch of *Virology* in 1954, many outstanding achievements in the field have been made, and the developments in our knowledge have been rapid, only outpaced perhaps by the ability of viruses to mutate, find new hosts, and otherwise present challenges for humankind. Alan Cann gives a brief overview of some of these historic advances in the new edition of his book (Cann, 2005). Looking back, among the important milestones are the demonstration by Sydney Brenner, François Jacob, and Matthew Meselson that bacteriophage T4 uses host-cell ribosomes to direct virus protein synthesis (1961), the discovery of hepatitis B virus in 1963 (Baruch Blumberg), and Mark Ptashne's isolation and study of the λ repressor protein (1967). Howard Temin and David Baltimore's independent discovery of reverse transcriptase in retroviruses was made in 1970, followed 2 years later by Paul Berg's creation of the first recombinant DNA molecules, comprising circular SV40 DNA genomes containing λ phage genes and the galactose operon of *E. coli*, an event that initiated the era of recombinant DNA technology. In 1973, Peter Doherty and Rolf Zinkernagel demonstrated the basis of antigenic recognition of the cellular immune system and the role of the major histocompatibility complex. Bernard Moss and Aaron Shatkin in 1975 showed in reovirus and vaccinia the role of the nucleotide cap at the 5′ end of messenger RNA in affecting correct processing during translation, later found to apply to other cellular mRNAs. Also during the 1970s, J. Michael Bishop and Harold Varmus discovered the cellular basis of retroviral oncogenes that in 1989 was rewarded with the Nobel prize. Richard Roberts and, independently, Phillip Sharp discovered introns in adenovirus genes in 1977, and Frederick Sanger and colleagues determined the complete sequence of the bacteriophage ΦX174 genome also in that year.

In 1980, one of the major achievements of the 20th century was celebrated, with the World Health Organization's official declaration of the global eradication of smallpox, still the only instance of the eradication of a human infectious disease to the present day. In 1981, Yorio Hinuma isolated human T-cell leukemia virus, the first human cancer virus to be identified. The next year, Stanley Prusiner demonstrated that the infectious proteins he called prions could cause scrapie, the first step in our understanding of transmissible spongiform encephalopathies. In 1983, Luc Montagnier and Robert Gallo announced the discovery of human immunodeficiency virus (HIV), the causative agent of AIDS. In 1985, a virus to vaccinate against swine herpes became the first genetically modified organism to be granted a license by the US Department of Agriculture. The following year, Roger Beachy and Rob Fraley published work that significantly improved the understanding of virus resistance (in this case tobacco mosaic virus) in plants, an important goal of plant breeders. 1989 brought the definitive identification of hepatitis C virus, and in 1993, the sequence of the smallpox virus genome was completed. Yuan Chang and Patrick Moore identified human herpesvirus 8, the causative agent of Kaposi's sarcoma, and in 2003, the newly discovered Mimivirus became the largest known virus, with a diameter of 400 nm and a genome of 1.2 Mbp, and in the same year, severe acute respiratory syndrome (SARS) broke out in China, subsequently spreading around the world.

Over these 50 years, *Virology* has published many thousands of papers that have chronicled or been instrumental in enabling these major steps forward. In total, there are presently over 21,500 articles available online, all the way back to Volume 1, Issue 1. Each one has been important in some way. Indeed, the articles published in *Virology* trace the intellectual evolution of the field. Compiling a list of the 'most important' papers, however, is an invidious task. Friendships can falter on such an undertaking, but perhaps, the most objective measure is the number of times a published paper is cited in other publications. This evaluation can of course be criticized for its bias towards papers describing novel techniques or methods. Arguably, older papers dominate because they have had more time in which to have been cited. On the other hand, the citation rates of these articles are also a measure of their persisting importance. On balance, it does represent a value in some way related to how often that paper has been used. With many caveats, the list of the 100 most-cited papers in *Virology* since records began is presented in Table 1. Many of the papers have helped or influenced both a great many people and a great many subsequent advances in virology.

Among the many ground-breaking and fascinating articles published in *Virology* over the last 50 years are over 150 from 24 Nobel-prize-winning scientists, including Werner Arber, David Baltimore, J. Michael Bishop, Sydney Brenner, Peter C. Doherty, Renato Dulbecco, Gertrude B. Elion, John F. Enders, D. Carleton Gajdusek, Leland H. Hartwell, Alfred D. Hershey, François Jacob, Neils K. Jerne, Arthur Kornberg, André Lwoff,

Table 1
The top 100 most frequently cited articles in *Virology* to date

Authors	Year	Title	Vol., pp.	Number of citations to date
Graham, F.L., Van Der Eb, A.J.	1973	A new technique for the assay of infectivity of human adenovirus 5 DNA	*Virology*, 52 (2), Pages 456–467.	2170
Zur Hausen, H.	1991	Human Papillomaviruses in the pathogenesis of anogenital cancer	*Virology*, 184 (1), Pages 9–13.	423
McGrory, W.J., Bautista, D.S., Graham, F.L.	1988	A simple technique for the rescue of early region I mutations into infectious human adenovirus type 5	*Virology*, 163 (2), Pages 614–617.	400
Markowitz, D., Goff, S., Bank, A.	1988	Construction and use of a safe and efficient amphotropic packaging cell line	*Virology*, 167 (2), Pages 400–406.	394
Ayres, M.D., Howard, S.C., Kuzio, J., Lopez-Ferber, M., Possee, R.D.	1994	The complete DNA sequence of *Autographa californica* nuclear polyhedrosis virus	*Virology*, 202 (2), Pages 586–605.	388
Connor, R.I., Chen, B.K., Choe, S., Landau, N.R.	1995	Vpr is required for efficient replication of human immunodeficiency virus type 1 in mononuclear phagocytes	*Virology*, 206 (2), Pages 935–944.	370
Gale Jr., M.J., Korth, M.J., Tang, N.M., Tan, S.-L., Hopkins, D.A., Dever, T.E., Polyak, S.J., Katze, M.G.	1997	Evidence that hepatitis C virus resistance to interferon is mediated through repression of the PKR protein kinase by the nonstructural 5A protein	*Virology*, 230 (2), Pages 217–227.	341
Gompels, U.A., Nicholas, J., Lawrence, G., Jones, M., Thomson, B.J., Martin, M.E.D., Efstathiou, S., Macaulay, H.A.	1995	The DNA sequence of human herpesvirus 6: structure, coding content, and genome evolution	*Virology*, 209 (1), Pages 29–51.	296
Goebel, S.J., Johnson, G.P., Perkus, M.E., Davis, S.W., Winslow, J.P., Paoletti, E.	1990	The complete DNA sequence of vaccinia virus	*Virology*, 179 (1), Pages 247–266 + 517.	296
Samuel, C.E.	1991	Antiviral actions of interferon interferon-regulated cellular proteins and their surprisingly selective antiviral activities	*Virology*, 183 (1), Pages 1–11.	290
Norder, H., Courouce, A.-M., Magnius, L.O.	1994	Complete genomes, phylogenetic relatedness, and structural proteins of six strains of the hepatitis B virus, four of which represent two new genotypes	*Virology*, 198 (1), Pages 489–503.	286
Ogawa, E., Inuzuka, M., Maruyama, M., Satake, M., Naito-Fujimoto, M., Ito, Y., Shigesada, K.	1993	Molecular cloning and characterization of PEBP2? the heterodimeric partner of a novel *Drosophila* runt-related DNA binding protein PEBP2?	*Virology*, 194 (1), Pages 314–331.	257
Telford, E.A.R., Watson, M.S., McBride, K., Davison, A.J.	1992	The DNA sequence of equine herpesvirus 1	*Virology*, 189 (1), Pages 304–316.	246
Doms, R.W., Lamb, R.A., Rose, J.K., Helenius, A.	1993	Folding and assembly of viral membrane proteins	*Virology*, 193 (2), Pages 545–562.	232
Weiner, A.J., Brauer, M.J., Rosenblatt, J., Richman, K.H., Tung, J., Crawford, K., Bonino, F., Han, J.H.	1991	Variable and hypervariable domains are found in the regions of HCV corresponding to the Flavivirus envelope and NS1 proteins and the Pestivirus envelope glycoproteins	*Virology*, 180 (2), Pages 842–848.	231
Okamoto, H., Kurai, K., Okada, S.-I., Yamamoto, K., Lizuka, H., Tanaka, T., Fukuda, S., Mishiro, S.	1992	Full-length sequence of a hepatitis C virus genome having poor homology to reported isolates: comparative study of four distinct genotypes	*Virology*, 188 (1), Pages 331–341.	228
Meulenberg, J.J.M., Hulst, M.M., De Meijer, E.J., Moonen, P.L.J.M., Den Besten, A., De Kluyver, E.P., Wensvoort, G., Moormann, R.J.M.	1993	Lelystad virus, the causative agent of porcine epidemic abortion and respiratory syndrome (PEARS), is related to LDV and EAV	*Virology*, 192 (1), Pages 62–72.	223
Xiang, Z.Q., Spitalnik, S., Tran, M., Wunner, W.H., Cheng, J., Ertl, H.C.J.	1994	Vaccination with a plasmid vector carrying the rabies virus glycoprotein gene induces protective immunity against rabies virus	*Virology*, 199 (1), Pages 132–140.	218
Jiang, X., Wang, M., Wang, K., Estes, M.K.	1993	Sequence and genomic organization of Norwalk virus	*Virology*, 195 (1), Pages 51–61.	217
Pellerin, C., Van den Hurk, J., Lecomte, J., Tijssen, P.	1994	Identification of a new group of bovine viral diarrhea virus strains associated with severe outbreaks and high mortalities	*Virology*, 203 (2), Pages 260–268.	216

(continued on next page)

Table 1 (*continued*)

Authors	Year	Title	Vol., pp.	Number of citations to date
Lee, S.B., Esteban, M.	1994	The interferon-induced double-stranded RNA-activated protein kinase induces apoptosis	*Virology*, 199 (2), Pages 491–496.	206
Ridpath, J.F., Bolin, S.R., Dubovi, E.J.	1994	Segregation of bovine viral diarrhea virus into genotypes	*Virology*, 205 (1), Pages 66–74.	205
Tam, A.W., Smith, M.M., Guerra, M.E., Huang, C.-C., Bradley, D.W., Fry, K.E., Reyes, G.R.	1991	Hepatitis E virus (HEV): molecular cloning and sequencing of the full-length viral genome	*Virology*, 185 (1), Pages 120–131.	204
Freed, E.O.	1998	HIV-1 Gag proteins: diverse functions in the virus life cycle	*Virology*, 251 (1), Pages 1–15.	199
Lamb, R.A.	1993	Paramyxovirus fusion: a hypothesis for changes	*Virology*, 197 (1), Pages 1–11.	199
Okamoto, H., Kojima, M., Okada, S.-I., Yoshizawa, H., Iizuka, H., Tanaka, T., Muchmore, E.E., Mishiro, S.	1992	Genetic drift of hepatitis C virus during an 8.2-year infection in a chimpanzee: variability and stability	*Virology*, 190 (2), Pages 894–899.	198
Fisher, K.J., Choi, H., Burda, J., Chen, S.-J., Wilson, J.M.	1996	Recombinant adenovirus deleted of all viral genes for gene therapy of cystic fibrosis	*Virology*, 217 (1), Pages 11–22.	192
Seedorf, K., Krammer, G., Durst, M.	1985	Human papillomavirus type 16 DNA sequence	*Virology*, 145 (1), Pages 181–185.	180
Laurent-Crawford, A.G., Krust, B., Muller, S., Riviere, Y., Rey-Cuille-, M.A., Bechet, J.-M., Montagnier, L., Hovanessian, A.G.	1991	The cytopathic effect of HIV is associated with apoptosis	*Virology*, 185 (2), Pages 829–839.	179
Colett, M.S., Larson, R., Gold, C., Strick, D., Anderson, D.K., Purchio, A.F.	1988	Molecular cloning and nucleotide sequence of the Pestivirus bovine viral diarrhea virus	*Virology*, 165 (1), Pages 191–199.	177
Doms, R.W., Peiper, S.C.	1997	Unwelcomed guests with master keyes: how HIV uses chemokine receptors for cellular entry	*Virology*, 235 (2), Pages 179–190.	175
Lanford, R.E., Sureau, C., Jacob, J.R., White, R., Fuerst, T.R.	1994	Demonstration of in vitro infection of chimpanzee hepatocytes with hepatitis C virus using strand-specific RT/PCR	*Virology*, 202 (2), Pages 606–614.	174
Warner, M.S., Geraghty, R.J., Martinez, W.M., Montgomery, R.I., Whitbeck, J.C., Xu, R., Eisenberg, R.J., Spear, P.G.	1998	A cell surface protein with herpesvirus entry activity (Hveb) confers susceptibility to infection by mutants of herpes simplex virus type 1, herpes simplex virus type 2, and pseudorabies virus	*Virology*, 246 (1), Pages 179–189.	173
Jacobs, B.L., Langland, J.O.	1996	When two strands are better than one: the mediators and modulators of the cellular responses to double-stranded RNA	*Virology*, 219 (2), Pages 339–349.	166
Okamoto, H., Takahashi, M., Nishizawa, T., Ukita, M., Fukuda, M., Tsuda, F., Miyakawa, Y., Mayumi, M.	1999	Marked genomic heterogeneity and frequent mixed infection of TT virus demonstrated by PCR with primers from coding and noncoding regions	*Virology*, 259 (2), Pages 428–436.	160
Ray, R.B., Meyer, K., Ray, R.	1996	Suppression of apoptotic cell death by hepatitis C virus core protein	*Virology*, 226 (2), Pages 176–182.	159
Graham, F.L., Van Der Eb, A.J.	1973	Transformation of rat cells by DNA of human adenovirus 5	*Virology*, 54 (2), Pages 536–539.	159
Ahrens, C.H., Russell, R.L.Q., Funk, C.J., Evans, J.T., Harwood, S.H., Rohrmann, G.F.	1997	The sequence of the *Orgyia pseudotsugata* multinucleocapsid nuclear polyhedrosis virus genome	*Virology*, 229 (2), Pages 381–399.	157
White, R.F.	1979	Acetylsalicylic acid (aspirin) induces resistance to tobacco mosaic virus in tobacco	*Virology*, 99 (2), Pages 410–412.	157
Barker, D.D., Berk, A.J.	1987	Adenovirus proteins from both E1B reading frames are required for transformation of rodent cells by viral infection and DNA transfection	*Virology*, 156 (1), Pages 107–121.	155
Zibert, A., Schreier, E., Roggendorf, M.	1995	Antibodies in human sera specific to hypervariable region 1 of hepatitis C virus can block viral attachment	*Virology*, 208 (2), Pages 653–661.	154
Gelderblom, H.R., Hausmann, E.H.S., Ozel, M.	1987	Fine structure of human immunodeficiency virus (HIV) and immunolocalization of structural proteins	*Virology*, 156 (1), Pages 171–176.	153
Spear, P.G., Eisenberg, R.J., Cohen, G.H.	2000	Three classes of cell surface receptors for alphaherpesvirus entry	*Virology*, 275 (1), Pages 1–8.	152

Table 1 (*continued*)

Authors	Year	Title	Vol., pp.	Number of citations to date
Ruggieri, A., Harada, T., Matsuura, Y., Miyamura, T.	1997	Sensitization to Fas-mediated apoptosis by hepatitis C virus core protein	*Virology*, 229 (1), Pages 68–76.	151
Palese, P., Tobita, K., Ueda, M., Compans, R.W.	1974	Characterization of temperature sensitive influenza virus mutants defective in neuraminidase	*Virology*, 61 (2), Pages 397–410.	147
Tartaglia, J., Perkus, M.E., Taylor, J., Norton, E.K., Audonnet, J.-C., Cox, W.I., Davis, S.W., Paoletti, E.	1992	NYVAC: A highly attenuated strain of vaccinia virus	*Virology*, 188 (1), Pages 217–232.	146
Meyers, G., Rumenapf, T., Thiel, H.-J.	1989	Molecular cloning and nucleotide sequence of the genome of hog cholera virus	*Virology*, 171 (2), Pages 555–567.	142
Rico-Hesse, R., Harrison, L.M., Salas, R.A., Tovar, D., Nisalak, A., Ramos, C., Boshell, J., Rosa, A.T.D.	1997	Origins of dengue type 2 viruses associated with increased pathogenicity in the Americas	*Virology*, 230 (2), Pages 244–251.	141
Sugrue, R.J., Hay, A.J.	1991	Structural characteristics of the M2 protein of influenza A viruses: evidence that it forms a tetrameric channel	*Virology*, 180 (2), Pages 617–624.	141
Lai, M.M.C.	1998	Cellular factors in the transcription and replication of viral RNA genomes: A parallel to DNA-dependent RNA transcription	*Virology*, 244 (1), Pages 1–12.	140
Kuzio, J., Pearson, M.N., Harwood, S.H., Funk, C.J., Evans, J.T., Slavicek, J.M., Rohrmann, G.F.	1999	Sequence and analysis of the genome of a baculovirus pathogenic for *Lymantria dispar*	*Virology*, 253 (1), Pages 17–34.	139
Clapham, P.R., Blanc, D., Weiss, R.A.	1991	Specific cell surface requirements for the infection of CD4-positive cells by human immunodeficiency virus types 1 and 2 and by simian immunodeficiency virus	*Virology*, 181 (2), Pages 703–715.	137
García-Sastre, A., Egorov, A., Matassov, D., Brandt, S., Levy, D.E., Durbin, J.E., Palese, P., Muster, T.	1998	Influenza A virus lacking the NS1 gene replicates in interferon-deficient systems	*Virology*, 252 (2), Pages 324–330.	135
Novick, R.	1967	Properties of a cryptic high-frequency transducing phage in *Staphylococcus aureus*	*Virology*, 33 (1), Pages 155-166.	134
Wyatt, L.S., Moss, B., Rozenblatt, S.	1995	Replication-deficient vaccinia virus encoding bacteriophage T7 RNA polymerase for transient gene expression in mammalian cells	*Virology*, 210 (1), Pages 202–205.	132
Boyer, J.-C., Haenni, A.-L.	1994	Infectious transcripts and cDNA clones of RNA viruses	*Virology*, 198 (1), Pages 415–426.	131
Geiss, G.K., Bumgarner, R.E., An, M.C., Agy, M.B., Van 'T Wout, A.B., Hammersmark, E., Carter, V.S., Katze, M.G.	2000	Large-scale monitoring of host cell gene expression during HIV-1 infection using cDNA microarrays	*Virology*, 266 (1), Pages 8–16.	130
Kirnbauer, R., Chandrachud, L.M., O'Neil, B.W., Wagner, E.R., Grindlay, G.J., Armstrong, A., McGarvie, G.M., Campo, M.S.	1996	Virus-like particles of bovine papillomavirus type 4 in prophylactic and therapeutic immunization	*Virology*, 219 (1), Pages 37–44.	128
Jurriaans, S., Van Gemen, B., Weverling, G.J., Van Strijp, D., Nara, P., Coutinho, R., Koot, M., Goudsmit, J.	1994	The natural history of HIV-1 infection: virus load and virus phenotype independent determinants of clinical course?	*Virology*, 204 (1), Pages 223–233.	128
Rico-Hesse, R.	1990	Molecular evolution and distribution of dengue viruses type 1 and 2 in nature	*Virology*, 174 (2), Pages 479–493.	127
Lednicky, J.A., Garcea, R.L., Bergsagel, D.J., Butel, J.S.	1995	Natural Simian virus 40 strains are present in human choroid plexus and ependymoma tumors	*Virology*, 212 (2), Pages 710–717.	126
Compton, T., Nowlin, D.M., Cooper, N.R.	1993	Initiation of human cytomegalovirus infection requires initial interaction with cell surface heparan sulfate	*Virology*, 193 (2), Pages 834–841.	126
Peden, K., Emerman, M., Montagnier, L.	1991	Changes in growth properties on passage in tissue culture of viruses derived from infectious molecular clones of HIV-1(LAI), HIV-1(MAL), and HIV-1(ELI)	*Virology*, 185 (2), Pages 661–672.	126

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Table 1 (*continued*)

Authors	Year	Title	Vol., pp.	Number of citations to date
Jacobsen, H., Yasargil, K., Winslow, D.L., Craig, J.C., Krohn, A., Duncan, I.B., Mous, J.	1995	Characterization of human immunodeficiency virus type 1 mutants with decreased sensitivity to proteinase inhibitor Ro 31-8959	*Virology*, 206 (1), Pages 527–534.	125
Carr, J.K., Salminen, M.O., Albert, J., Sanders-Buell, E., Gotte, D., Birx, D.L., McCutchan, F.E.	1998	Full genome sequences of human immunodeficiency virus type 1 subtypes G and A/G intersubtype recombinants	*Virology*, 247 (1), Pages 22–31.	124
Ding, B., Li, Q., Nguyen, L., Palukaitis, P., Lucas, W.J.	1995	Cucumber mosaic virus 3a protein potentiates cell-to-cell trafficking of CMV RNA in tobacco plants	*Virology*, 207 (2), Pages 345–353.	124
Karasev, A.V., Boyko, V.P., Gowda, S., Nikolaeva, O.V., Hilf, M.E., Koonin, E.V., Niblett, C.L., Dawson, W.O.	1995	Complete sequence of the citrus tristeza virus RNA genome	*Virology*, 208 (2), Pages 511–520.	123
Massung, R.F., Liu, L.-I., Qi, J., Knight, J.C., Yuran, T.E., Kerlavage, A.R., Parsons, J.M., Esposito, J.J.	1994	Analysis of the complete genome of smallpox variola major virus strain Bangladesh–1975	*Virology*, 201 (2), Pages 215–240.	122
Huang, C.-C., Nguyen, D., Fernandez, J., Yun, K.Y., Fry, K.E., Bradley, D.W., Tam, A.W., Reyes, G.R.	1992	Molecular cloning and sequencing of the Mexico isolate of hepatitis E virus (HEV)	*Virology*, 191 (2), Pages 550–558.	122
Maizel Jr., J.V., White, D.O., Scharff, M.D.	1968	The polypeptides of adenovirus. I. Evidence for multiple protein components in the virion and a comparison of types 2, 7A, and 12.	*Virology*, 36 (1), Pages 115–125.	122
Lukac, D.M., Renne, R., Kirshner, J.R., Ganem, D.	1998	Reactivation of Kaposi's sarcoma-associated herpesvirus infection from latency by expression of the ORF 50 transactivator, a homolog of the EBV R protein	*Virology*, 252 (2), Pages 304–312.	121
Antoine, G., Scheiflinger, F., Dorner, F., Falkner, F.G.	1998	The complete genomic sequence of the modified vaccinia Ankara strain: comparison with other orthopoxviruses	*Virology*, 244 (2), Pages 365–396.	121
Yanez, R.J., Rodriguez, J.M., Nogal, M.L., Yuste, L., Enriquez, C., Rodriguez, J.F., Vinuela, E.	1995	Analysis of the complete nucleotide sequence of African swine fever virus	*Virology*, 208 (1), Pages 249–278.	120
Conzelmann, K.-K., Visser, N., Van Woensel, P., Thiel, H.-J.	1993	Molecular characterization of porcine reproductive and respiratory syndrome virus, a member of the arterivirus group	*Virology*, 193 (1), Pages 329–339.	120
Layne, S.P., Merges, M.J., Dembo, M., Spouge, J.L., Conley, S.R., Moore, J.P., Raina, J.L., Nara, P.L.	1992	Factors underlying spontaneous inactivation and susceptibility to neutralization of human immunodeficiency virus	*Virology*, 189 (2), Pages 695–714.	119
Upton, C., Macen, J.L., Schreiber, M., McFadden, G.	1991	Myxoma virus expresses a secreted protein with homology to the tumor necrosis factor receptor gene family that contributes to viral virulence	*Virology*, 184 (1), Pages 370–382.	118
Zhou, J., Sun, X.Y., Stenzel, D.J., Frazer, I.H.	1991	Expression of vaccinia recombinant HPV 16 L1 and L2 ORF proteins in epithelial cells is sufficient for assembly of HPV virion-like particles	*Virology*, 185 (1), Pages 251–257.	118
Rowe, W.P., Pugh, W.E., Hartley, J.W.	1970	Plaque assay techniques for murine leukemia viruses	*Virology*, 42 (4), Pages 1136–1139.	117
Nagy, P.D., Simon, A.E.	1997	New insights into the mechanisms of RNA recombination	*Virology*, 235 (1), Pages 1–9.	115
Sattentau, Q.J., Zolla-Pazner, S., Poignard, P.	1995	Epitope exposure on functional, oligomeric HIV-1 gp41 molecules	*Virology*, 206 (1), Pages 713–717.	115
Schneemann, A., Schneider, P.A., Lamb, R.A., Lipkin, W.I.	1995	The remarkable coding strategy of Borna disease virus: a new member of the nonsegmented negative strand RNA viruses	*Virology*, 210 (1), Pages 1–8.	115
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Table 1 (*continued*)

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Daniel Nathans, Stanley B. Prusiner, George E. Palade, Frederick C. Robbins, Phillip A. Sharp, Hamilton O. Smith, Howard M. Temin, Harold E. Varmus, and Thomas H. Weller. Time will tell how many will be added in the coming decades.

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