OptiPrep™ Reference List RV06

GROUP VI VIRUSES

- **Viruses are listed alphabetically within the Baltimore scheme: Family, Genus and Species. Publications are listed alphabetically by first author and, where necessary, references are further divided according to research topic**
- **Multiple entries from the same first author are listed chronologically.**
- **For a detailed methodology of Group VI viruses see OptiPrep™ Application Sheets V29-V35. V06 is a methodological review of OptiPrep™ technology.**
- **For a comparative structural analysis of all Group VI virsues refer to: Martin, J.L.**, Cao, S., Maldonado, J.O., Zhang, W. and Mansky, L.M. (2016) *Distinct particle morphologies revealed through comparative parallel analyses of retrovirus-like particles* J. Virol., **90**, 8074-8084

1. *Alpharetroviridae*

Rous sarcoma virus

Lee, E-G., Yeo, A., Kraemer, B., Wickens, M. and Linial, M.L. (1999) *The Gag domains required for avian retroviral RNA encapsidation determined by using two independent assays* J. Virol, **73,** 6282-6292

Ochsenbauer-Jambor, C., Delos, S.E., Accavitti, M.A., White, J.M. and Hunter, E. (2002) *Novel monoclonal antibody directed at the receptor binding site on the avian sarcoma and leukosis virus env complex* J. Virol., **76**, 7518-7527

2. *Betaretroviridae*

Mason-Pfizer Monkey virus (Simian retrovirus)

Fuzik, T., Pichalova, R., Schur, F.K.M., Strohalmova, K., Križova, I., Hadravova, R., Rumlova, M., Briggs, J.A.G., Ulbrich, P. and Ruml, T. (2016) *Nucleic acid binding by Mason-Pfizer monkey virus CA promotes virus assembly and genome packaging* J. Virol., **90**, 4593-4603

Gottwein, E., Bodem, J., Müller, B., Schmechel, A., Zentgraf, H. and Kräusslich, H-G. (2003) *The Mason-Pfizer monkey virus PPPY and PSAP motifs both contribute to virus release* J. Virol., **77**, 9474-9485

Voráčková, I., Ulbrich, P., Diehl, W.E. and Ruml, T. (2104) *Engineered retroviral virus-like particles for receptor targeting* Arch.Virol., **159**, 677–688

Wildová, M., Hadravová, R. Štokrová, J., Křížová, I., Ruml, T., Hunter, E., Pichová, I. and Rumlová, M. (2008) *The effect of point mutations within the N-terminal domain of Mason-Pfizer monkey virus capsid protein on virus core assembly and infectivity* Virology, **380**, 157-163

3. *Deltaretroviridae*

Human T-cell lymphotropic virus (HTLV-1)

Cao, S., Maldonado, J.O., Grigsby, I.F., Mansky, L.M. and Zhang, W. (2015) *Analysis of human T-cell leukemia virus type 1 particles by using cryo-electron tomography* J. Virol., **89**, 2182-2191

Hémonnot, B., Molle, D., Bardy, M., Gay, B., Laune, D., Devaux, C. and Briant, L. (2006) *Phosphorylation of the HTLV-1 matrix L-domain-containing protein by virus-associated ERK-2 kinase* Virology, **349**, 430-439

Martin, J.L., Mendonça, M., Marusinec, R., Zuczek, J., Angert, I., Blower, R.J., Mueller, J.D., Perilla, J.R. et al (2018) *Critical role of the human T-cell leukemia virus type 1 capsid N-terminal domain for Gag-Gag interactions and virus particle assembly* J. Virol., **14**: e00333-18

Meissner, M.E., Mendonça, L.M., Zhang, W. and Mansky, L.M. (2017) *Polymorphic nature of human T-cell leukemia virus type 1 particle cores as revealed through characterization of a chronically infected cell line* J. Virol., **91**: e00369-17-pfizer

Møller-Larsen, A. and Christensen, T. (1998) *Isolation of a retrovirus from multiple sclerosis patients in self-generated iodixanol gradients* J. Virol. Methods, **73**, 151-161

4. *Gammaretroviridae*

Moloney murine leukaemia virus

Courtney, D.G., Chalem, A., Bogerd, H.P., Law, B.A., Kennedy, E.M., Holley, C.L. and Cullen, B.R. (2019) *Extensive epitranscriptomic methylation of A and C residues on murine leukemia virus transcripts enhances viral gene expression* mBio **10**: e01209-19

Eckwahl, M.J., Sim, S.,. Smith, D., Telesnitsky, A. and Wolin, S.L. (2015) *A retrovirus packages nascent host noncoding RNAs from a novel surveillance pathway* Genes Devel., **29**, 646–657

Leblanc, P., Alais, S., Porto-Carriero, I., Lehmann, S., Grassi, J., Raposo, G. and Darlix, J.L. (2006) *Retrovirus infection strongly enhances scrapie infectivity release in cell culture* EMBO J., **25**, 2674-2685

Onafuwa-Nuga, A.A., King, S.R. and Telesnitsky, A. (2005) *Nonrandom packaging of host RNAs in moloney murine leukemia virus* J. Virol., **79**, 13528-13537

Qu, K., Glass, B., Doelžal, M., Schur, F.K.M., Murciano, B., Rein, A., Rumlová, M., Ruml, T., Kräusslich, H.G. and Briggs, J.A.G. (2018) *Structure and architecture of immature and mature murine leukemia virus capsids* Proc. Natl. Acad. Sci. USA, **115**, E11751–E11760

Segura, M.M., Garnier, A., Di Falco, M.R., Whissell, G., Meneses-Acosta, A., Arcand, N. and Kamen, A. (2008) *Identification of host proteins associated with retroviral vector particles by proteomic analysis of highly purified vector preparations* J. Virol., **82** 1107-1117

Murine oncornavirus

Fujisawa, R., McAtee, F.J., Favara, C., Hayes, S.F. and Portis, J.L. (2001) *N-terminal cleavage fragment of glycosylated Gag is incorporated into murine oncornavirus particles* J. Virol., **75**, 11239-11243

5 *Lentivirus*

Feline immunodeficiency virus

Ammersbach, M. and Bienzle, D. (2011) *Methods for assessing feline immunodeficiency virus infection, infectivity and purification* Vet. Immunol. Immunopathol.,**143**, 202– 214

Human endogenous retroviruses

Li, M., Radvanyi, L., Yin, B., Li, J., Chivukula, R., Lin, K., Lu, Y., Shen, J.J., Chang, D.Z. et al (2017) *Downregulation of human endogenous retrovirus type K (HERV-K) viral env RNA in pancreatic cancer cells decreases cell proliferation and tumor growth* Clin Cancer Res., **23,** 5892–5911

Human immunodeficiency virus-1 (HIV-1)

Actin

Popova, S., Popova, E., Inoue, M., Wu, Y. and Göttlinger, H. (2018) *HIV-1 gag recruits PACSIN2 to promote virus spreading* Proc. Natl. Acad. Sci. USA, **115**, 7093–7098

Stauffer, S., Rahman, S.A., de Marco, A., Carlson, L-A., Glass, B., Oberwinkler, H., Herold, N., Briggs, J.A.G., Müller, B., Grünewald, K. and Kräusslich, H-G. (2014) T*he nucleocapsid domain of Gag is dispensable for actin incorporation into HIV-1 and for association of viral budding sites with cortical F-actin* J. Virol., **88**, 7893–7903

Adenosine deaminase

Orecchini, E., Federico, M., Doria, M., Arenaccio, C., Giuliani, E., Ciafrè, S.A. and Michienzi, A. (2015) *The ADAR1 editing enzyme is encapsidated into HIV-1 virions* Virology, **485,** 475–480

Antiretroviral agents/therapy

De Silva Feelixge, H.S., Stone, D., Pietz, H.L., Roychoudhury, P., Greninger, A.L., Schiffer, J.T., Aubert, M. and Jerome, K.R. (2016) *Detection of treatment-resistant infectious HIV after genome-directed antiviral endonuclease therapy* Antiviral Res., **126**, 90-98

Frezza, C., Grelli, S., Federico, M., Marino-Merlo, F., Mastino, A. and Macchi, B. (2016) *Testing anti-HIV activity of antiretroviral agents in vitro using flow cytometry analysis of CEM-GFP cells infected with transfection-derived HIV-1 NL4-3* J. Med. Virol. **88**, 979–986

Henriet, S., Mercenne, G., Bernacchi, S., Paillart, J-C. and Marquet, R. (2009) *Tumultuous relationship between the human immunodeficiency virus type 1 viral infectivity factor (Vif) and the human APOBEC-3G and APOBEC-3F restriction factors* Microbiol. Mol. Biol. Rev., **73**, 211-232

Ingemarsdotter, C.K., Zeng, J., Long, Z., Lever, A.M.L. and Kenyon, J.C. (2018) *An RNA-binding compound that stabilizes the HIV-1 gRNA packaging signal structure and specifically blocks HIV-1 RNA encapsidation* Retrovirology, **15**: 25

Lassen, K.G., Wissing, S., Lobritz, M.A., Santiago, M. and Greene, W.C. (2010) *Identification of two APOBEC3F splice variants displaying HIV-1 antiviral activity and contrasting sensitivity to Vif* J. Biol. Chem., **285**, 29326–29335
Mangeat, B., Turelli, P., Caron, G., Friedil, M., Perrin, L. and Trono, D. (2003) *Broad antiretroviral defence by human APOBEC3G through lethal editing of nascent reverse transcripts* Nature, **424**, 99-103
Soros, V.B., Yonemoto, W. and Greene, W.C. (2007) *Newly synthesized APOBEC3G is incorporated into HIV virions, inhibited by HIV RNA and subsequently activated by RNase H* PLoS Pathog., 3:e15
Yukl, S.A., Shergill, A.K., McQuaid, K., Gianella, S., Lampiris, H., Hare, C.B., Pandori, M., Sinclair, E., Günthard, H.F., Fischer, M., Wong, J.K. and Havlir, D.V. (2010) *Effect of raltegravir-containing intensification on HIV burden and T-cell activation in multiple gut sites of HIV-positive adults on suppressive antiretroviral therapy* AIDS , **24**, 2451–2460
Yukl, S.A., Gianella, S., Sinclair, E., Epling, L., Li, Q., Duan, L., Choi, A.L.M., Girling, V., Ho, T., Li, P., Fujimoto, K., et al (2010) *Differences in HIV burden and immune activation within the gut of HIV-positive patients receiving suppressive antiretroviral therapy* J. Infect. Dis., **202**, 1553–1561

Autophagy

Campbell, G.R., Rawat, P., Bruckman, R.S. and Spector, S.A. (2015) *Human immunodeficiency virus type 1 Nef inhibits autophagy through transcription factor EB sequestration* PLoS Pathog **11**: e1005018
Campbell, G.R., Bruckman, R.S., Chu, Y-L., Trout, R.N. and Spector, S.A., (2018) *SMAC mimetics induce autophagy-dependent apoptosis of HIV-1-infected resting memory CD4$^+$ T cells* Cell Host & Microbe 24, 689–702

Budding

Carlson, L-A., Briggs, J.A.G., Glass, B., Riches, J.D., Simon, M.N., Johnson, M.C., Müller, B., Grünewald, K., Kräusslich, H-G. (2008) *Three-dimensional analysis of budding sites and released virus suggests a revised model for HIV-1 morphogenesis* Cell Host Microbe **4**, 592-599
Leblanc, P., Alais, S., Porto-Carriero, I., Lehmann, S., Grassi, J., Raposo, G. and Darlix, J.L. (2006) *Retrovirus infection strongly enhances scrapie infectivity release in cell culture* EMBO J., **25**, 2674-2685
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Stauffer, S., Rahman, S.A., de Marco, A., Carlson, L-A., Glass, B., Oberwinkler, H., Herold, N., Briggs, J.A.G., Müller, B., Grünewald, K. and Kräusslich, H-G. (2014) T*he nucleocapsid domain of Gag is dispensable for actin incorporation into HIV-1 and for association of viral budding sites with cortical F-actin* J. Virol., **88**, 7893–7903
Stuchell, M.D., Garrus, J.E., Müller, B., Stray, K.M., Ghaffarian, S., McKinnon, R., Kräusslich, H-G., Morham, S.G. and Sundquist, W.I. (2004) *The human endosomal sorting complex required for transport (ESCRT-I) and its role in HIV-1 budding* J. Biol. Chem., **279**, 36059-36071
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Zhao, W-L., Zhang, F., Feng, D., Wu, J., Chen, S. and Sui, S-F. (2009) *A novel sorting strategy of trichosanthin for hijacking human immunodeficiency virus type 1* Biochem. Biophys. Res. Commun., **384**, 347–351

Capsid assembly/disassembly and structure

Martin, J.L., Mendonça, L.M., Angert, I., Mueller, J.D., Zhang, W. and Manskya, L.M. (2017) *Disparate contributions of human retrovirus capsid subdomains to Gag-Gag oligomerization, virus morphology, and particle biogenesis* J. Virol., **91**: e00298-17
Mattei, S., Flemming, A., Anders-Össwein, M., Kräusslich, H-G., Briggs, J.A.G. and Müller, B. (2015) *RNA and nucleocapsid are dispensable for mature HIV-1 capsid assembly* J. Virol., **89**, 9739-9747
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Cellular interactions/entry/transfer

Akiyama, H., Miller, C., Patel, H.V., Hatch, S.C., Archer, J., Ramirez, N-G.P. and Gummuluru, S. (2014) *Virus particle release from glycosphingolipid-enriched microdomains is essential for dendritic cell-mediated capture and transfer of HIV-1 and Henipavirus* J. Virol., **88**, 8813–8825

Dobrowsky, T.M., Zhou, Y., Sun, S.X., Siliciano, R.F. and Wirtz, D. (2008) *Monitoring early fusion dynamics of human immunodeficiency virus type 1 at single-molecule resolution* J. Virol., **82**, 7022-7033

Gilbert, C., Cantin, R., Barat, C. and Tremblay, M.J. (2007) *Human immunodeficiency virus type 1 replication in dendritic cell-T-cell co-cultures is increased upon incorporation of host LFA-1 due to higher levels of virus production in immature dendritic cells* J. Virol., **81**, 7672-7682

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Izquierdo-Useros, N., Lorizate, M., Contreras, F-X., Rodriguez-Plata, M.T., Glass, B., Erkizia, I., Prado, J.G. et al (2012) *Sialyllactose in viral membrane gangliosides is a novel molecular recognition pattern for mature dendritic cell capture of HIV-1* PLoS Biol., **10**: e1001315

Pang, H-B., Hevroni, L., Kol, N., Eckert, D.M., Tsvitov, M., Kay, M.S. and Rousso, I. (2013) *Virion stiffness regulates immature HIV-1 entry* Retrovirology, **10**: 4

Popova, S., Popova, E., Inoue, M., Wu, Y. and Göttlinger, H. (2018) *HIV-1 gag recruits PACSIN2 to promote virus spreading* Proc. Natl. Acad. Sci. USA, **115**, 7093–7098

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St-Pierre, C., Ouellet, M., Tremblay, M.J. and Sato, S. (2010) *Galectin-1 and HIV-1 infection* Methods Enzymol., **480**, 267-294

Zhao, W-L., Zhang, F., Feng, D., Wu, J., Chen, S. and Sui, S-F. (2009) *A novel sorting strategy of trichosanthin for hijacking human immunodeficiency virus type 1* Biochem. Biophys. Res. Commun., **384**, 347–351

Chikungunya virus assay

Kishishita, N., Takeda, N., Anuegoonpipat, A. and Anantapreechac, S. (2013) *Development of a pseudotyped-lentiviral-vector-based neutralization assay for Chikungunya virus infection* J. Clin. Microbiol., **51**, 1389–1395

Cholesterol (membrane)

Campbell, S. M., Crowe, S. M. and Mak, J. (2002) *Virion-associated cholesterol is critical for the maintenance of HIV-1 structure and infectivity* AIDS, **16**, 2253-2261

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Cytotoxicity

Alsahafi, N., Bakouche, N., Kazemi, M., Richard, J., Ding, S., Bhattacharyya, S., Das, D., Anand, S.P. et al (2019) *An asymmetric opening of HIV-1 envelope mediates antibody-dependent cellular cytotoxicity* Cell Host Microbe, **25**, 578–587

Defective core virus

Joshi, P., Sloan, B., Torbett, B.E. and Stoddart, C.A. (2013) *Heat shock protein 90AB1 and hyperthermia rescue infectivity of HIV with defective cores* Virology, **436**, 162–172

Endosomal sorting complex

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Envelope components/structure/function

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Henderson, R., Lu, M., Zhou, Y., Mu, Z., Parks, R., Han, Q., Hsu, A.L., Carter, E. et al (2020) *Disruption of the HIV-1 Envelope allosteric network blocks CD4-induced rearrangements* Nat. Comm., **11**: 520

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Lu, M., Ma, X., Castillo-Menendez, L.R., Gorman, J., Alsahafi, N., Ermel, U., Terry, D.S., Chambers, M., Peng, D., Zhang, B. et al (2019) *Associating HIV-1 envelope glycoprotein structures with states on the virus observed by smFRET* Nature, **568**, 415-419

Lu, W., Chen, S., Yu, J., Behrens, R., Wiggins, J., Sherer, N., Liu, S-L., Xiong, Y., Xiang, S-H. and Wu, L. (2019) *The polar region of the HIV-1 envelope protein determines viral fusion and infectivity by stabilizing the gp120-gp41 association* J. Virol., **93**: e02128-18
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Neuron survival studies

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6 *Spumaviridae*

Spumavirus – Foamy virus

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