

REFERENCES

- Allison S.L., J. Schalich, K. Stiasny, C.W. Mandl, C. Kunz, and F.X. Heinz. 1995. Oligomeric rearrangement of tick-borne encephalitis virus envelope proteins induced by an acidic pH. *J. Virol.* 69: 695-700.
- Allison S.L., K. Stiasny, K. Stadler, C.W. Mandl, and F.X. Heinz. 1999. Mapping of functional elements in the stem-anchor region of tick-borne encephalitis virus envelope protein E. *J. Virol.* 73: 5605-5612.
- Anderson R., S. Wang, C. Osiowy, and A.C. Issekutz. 1997. Activation of endothelial cells via antibody-enhanced dengue virus infection of peripheral blood monocytes. *J. Virol.* 71: 4226-4232.
- Basak A., M. Zhong, J.S. Munzer, M. Chretien, and N.G. Seidah. 2001. Implication of the proprotein convertases furin, PC5 and PC7 in the cleavage of surface glycoproteins of Hong Kong, Ebola and respiratory syncytial viruses: a comparative analysis with fluorogenic peptides. *Biochem. J.* 353: 537-545.
- Bazan J.F., and F. Fletterick. 1989. Detection of a trypsin-like proteinase domain in flaviviruses and pestiviruses. *Virology* 171: 637-639.
- Beasley D.M., and J.G. Aaskov. 2001. Epitopes on the dengue 1 virus envelope protein recognized by neutralizing IgM monoclonal antibodies. *Virology* 279: 447-458.
- Bergeron F., R. Leduc, and R. Day. 2000. Subtilisin-like pro-protein convertases: from molecular specificity to therapeutic applications. *J. Mol. Endocrin.* 24: 1-22.
- Bhamarapravati N., P. Tuchinda, and V. Boonyapaknavik. 1967. Pathology of Thailand haemorrhagic fever: a study of 100 autopsy cases. *Ann. Trop. Med. Parasitol.* 61: 500-510.
- Bhardwaj S., M. Holbrook, R.E. Shope, A.D.T. Barrett, and S.J. Watowich. 2001. Biophysical characterization and vector-specific antagonist activity of domain III of the tick-borne flavivirus envelope protein. *J. Virol.* 75: 4002-4007.

- Bielefeldt-Ohmann H. 1998. Analysis of antibody-independent binding of dengue viruses and dengue virus envelope protein to human myelomonocytic cells and B lymphocytes. *Virus Res.* 57: 63-79.
- Binley J.M., R.W. Sanders, A. Master, C.S. Cayan, C.L. Wiley, L. Schiffner, B. Travis, S. Kuhmann, D.R. Burton, S.-L. Hu, W.C. Olson, and J.P. Moore. 2002. Enhancing the proteolytic maturation of human immunodeficiency virus type 1 envelope glycoproteins. *J. Virol.* 76: 2606-2616.
- Brakch N., M. Dettin, C. Scarinci, N.G. Seidah, and C. Di Bello. 1995. Structural investigation and kinetic characterization of potential cleavage sites of HIV gp160 by human furin and PC1. *Biochem. Biophys. Res. Comm.* 213: 356-361.
- Bray M., and C.J. Lai. 1991. Dengue virus premembrane and membrane proteins elicit a protective immune response. *Virology* 185: 505-508.
- Brennan S.O., and K. Nakayama. 1994. Cleavage of proalbumin peptides by furin reveals unexpected restrictions at the P2 and P'1 sites. *FEBS Lett.* 347: 80-84.
- Brinton M.A., A.V. Fernandez, and J. Amato. 1986. The 3' nucleotides of flavivirus genomic RNA form a conserved secondary structure. *Virology* 162: 113-121.
- Bryan P., M.W. Pantoliano, S.G. Quill, H.Y. Hsiao, and T. Poulos. 1986. Site-directed mutagenesis and the role of the oxyanion hole in subtilisin. *Proc. Natl. Acad. Sci. USA.* 83: 3743-3745.
- Burke D.S., A. Nisalak, D.E. Johnson, and R.M. Scott. 1988. A prospective study of dengue infections in Bangkok. *Am. J. Trop. Med. Hyg.* 38: 172-180.
- Burke D.S., and T. P. Monath. 2001. *Flaviviruses*. In D.M. Knipe, P. M. Howley, D. E. Griffin, R.A. Lamb, M.A. Martin, B. Roizman, and S.E. Strauss (ed.), *Fields' virology*, 4th ed. Lippincott Williams & Wilkins, Philadelphia. Pp. 1043-1125.
- Calisher C.H., N. Karabatsos, J.M. Dalrymple, R.E. Shope, J.S. Porter-field, E.G. Westaway, and W.E. Brandt. 1989. Antigenic relationships between flaviviruses as determined by cross-neutralization tests with polyclonal antisera. *J. Gen. Virol.* 70: 37-43.
- Cardosa M.J. 1998. Dengue vaccine design: Issues and challenges. *Br. Med. Bull.* 54 (2): 395-405. Review.

- Caspar D.L.D., and A. Klug. 1962. Physical principles in the construction of regular viruses. Cold Spring Harbor Symp. Quant. Biol. 27: 1-24.
- Chan S.J., A.A. Jr. Oliva, J. La Mendola, A. Grens, H. Bode, and D.F. Steiner. 1992. Conservation of the prohormone convertase gene family in metazoa: analysis cDNA encoding a PC3 like protein from hydra. Proc. Natl. Acad. Sci. USA. 89: 6678-8862.
- Chen J.S. and A.S. Raikhel. 1996. Subunit cleavage of mosquito pro-vitellogenin by a subtilisin-like convertase. Proc. Natl. Acad. Sci. USA. 93: 6186-6190.
- Chen Y., T. Maguire, R.E. Hileman, J.R. Fromm, J.D. Esko, R.J. Linhardt, and R.M. Marks. 1997. Dengue virus infectivity depends on envelope protein binding to target cell heparan sulfate. Nat. Med. 3: 866-871.
- Creemers J.W., M. Vey, W. Schafer, T.A. Ayoubi, A.J. Roebroek, H.S. Klenk, W. Garten, and W.J. Van de Ven. 1995. Endoproteolytic cleavage of its propeptide is a prerequisite for efficient transport of furin out of the endoplasmic reticulum. J. Biol. Chem. 270: 2695-2702.
- Creemers J.W., R.J. Siezen, A.J. Roebroek, T.A. Ayoubi, D. Huylebroeck, and W.J. Van de Ven. 1993. Modulation of furin-mediated proprotein processing activity by site-directed mutagenesis. J. Biol. Chem. 268: 21826-21834.
- Crill W.D., and J.T. Roehrig. 2001. Monoclonal antibodies that bind to domain III of dengue virus E glycoprotein are the most efficient blockers of virus adsorption to vero cells. J. Virol. 75: 7769-7773.
- Decroly E., S. Wouters, C. Di Bello, C. Lazure, J.M. Ruyschaert, and N.G. Seidah. 1996. Identification of the paired basic convertases implicated in HIV gp160 processing based on *in vitro* assays and expression in CD4⁺ cell lines. J. Biol. Chem. 271: 30442-30450.
- Denault J-B., and R. Luduc. 1995. Minireview Furin/PACE/SPC1: a convertase involved in exocytic and endocytic processing of precursor proteins. FEBS Lett. 379: 113-116.
- Eder J., M. Rheinhecker, and A.R. Fersht. 1993. Folding of subtilisin BPN': role of the pro-sequence. J. Mol. Biol. 233: 293-304.

- Elshuber S., S.L. Allison, F.X. Heinz, and C.W. Mandl. 2003. Cleavage of protein prM is necessary for infection of BHK-21 cells by tick-borne encephalitis virus. *J. Gen. Virol.* 84: 183-191.
- Falconar A.K.I. 1999. Identification of an epitope on the dengue virus membrane (M) protein defined by cross-protective monoclonal antibodies: design of an improved epitope sequence based on common determinants present in both envelope (E and M) proteins. *Arch. Virol.* 144: 2313-2330.
- Falgout B., and L. Markoff. 1995. Evidence that Flavivirus NS1-NS2A cleavage is mediated by a membrane-bound host proteinase in the endoplasmic reticulum. *J. Virol.* 69: 7232-7243.
- Fenouillet E., and J.C. Gluckman. 1992. Immunological analysis of human immunodeficiency virus type 1 envelope glycoprotein proteolytic cleavage. *Virology* 187: 825-828.
- Ferlenghi I., M. Clarke, T. Ruttan, S.L. Allison, J. Schlich, F.X. Heinz, S. C. Harrison, F.A. Rey, and S.D. Fuller. 2001. Molecular organization of a recombinant subviral particle from tick-borne encephalitis virus. *Mol. Cell.* 7: 593-602.
- Germi R., J.M. Crance, D. Garin, J. Guimet, H. Lortat-Jacob, R.W. Ruigrok, J. P. Zarski, and E. Drouet. 2002. Heparan sulfate-mediated binding of infectious dengue virus type 2 and yellow fever virus. *Virology* 292: 162-168.
- Goodman L.J., and C.M. Gorman. 1994. Autoproteolytic activation of the mouse prohormone convertase mPC1. *Biochem. Biophys. Res. Comm.* 201: 795-804.
- Gorbalenya A.E., A.P. Donchenko, E.V. Koonin, and V.M. Blinov. 1989. N-terminal domains of putative helicases of flavi- and pestiviruses may be serine proteases. *Nuc. Acids Res.* 17: 3889-3897.
- Gubler D.J. 1997. Dengue and dengue hemorrhagic fever: its history and resurgence as a global public health problem. In: Gubler D.J., Kuno G., eds. *Dengue and dengue hemorrhagic fever*, Wallingford, UK: CAB International: 1-22.
- Gubler D.J. 1998. Dengue and dengue hemorrhagic fever: *Clin. Microbiol. Rev.* 11: 480-496.
- Gubler D.J., and G.G. Clark. 1995. Dengue/dengue hemorrhagic fever: the emergence of a global earth problem. *Emerg. Infect. Dis.* 1: 55-57.

- Guirakhoo F., A.R. Hunt, J.G. Lewis, and J.T. Roehrig. 1993. Selection and partial characterization of dengue 2 virus mutants that induce fusion at elevated pH. *Virology* 194: 219-223.
- Guirakhoo F., F.X. Heinz, C.W. Mandl, H. Holzmann, and C. Kunz. 1991. Fusion activity of flaviviruses: comparison of mature and immature (prM-containing) tick-borne encephalitis virions. *J. Gen. Virol.* 72: 1323-1329.
- Guzman M.G., G. Kouri, L. Valdes, J. Bravo, M. Alvarez, S. Vazques, I. Delgado, and S.B. Halstead. 2000. Epidemiologic studies on dengue in Santiago de Cuba, 1997. *Am. J. Epidemiol.* 152 (9): 793-799.
- Hahn Y.S., R.Galler, T. Hunkapiller, J.M. Dalerymple, J.H. Strauss, and E.G. Strauss. 1988. Nucleotide sequence of dengue 2 RNA and comparison of the encode proteins with those of other flaviviruses. *Virology* 162: 167-180.
- Halstead S.B. 1988. Pathogenesis of dengue: challenges to molecular biology. *Science* 239: 476-481.
- Halstead S.B. 1989. Antibody, macrophages, dengue virus infection, shock, and hemorrhage: a pathogenic cascade. *Rev. Infect. Dis.* 11 (suppl 4): S830-839.
- Hatsuzawa K., K. Murakami, and K. Nakayama. 1992. Molecular and enzymatic properties of furin, a Ken2-like endoprotease involved in precursor cleavage at Arg-X-Lys/Arg-Arg sites. *J.Biochem.* 111:296-301.
- Hatsuzawa K., M. Nagahama, S. Takahashi, K. Takada, K. Murakami, and K. Nakayama. 1992. Purification and characterization of furin, a Kex2-like processing endoprotease, produced in Chinese hamster ovary cells. *J. Biol. Chem.* 267: 16094-16099.
- Heinz F.X., and S.L. Allison. 2000. Structures and mechanisms in flavivirus fusion. *Adv. Virus. Res.* 55: 231-269.
- Heinz F.X., and S.L. Allison. 2001. The machinery for flavivirus fusion with host cell membranes. *Curr. Opin. Microbiol.* 4: 450-455.
- Heinz F.X., C.W. Mandl, H. Holzmann, C. Kunz, B.A. Harris, F. Rey, and S.C. Harrison. 1991. The flavivirus envelope protein E: isolation of a soluble form from tick-borne encephalitis virus and its crystallization. *J. Virol.* 65: 5579-5583.

- Heinz F.X., K. Stiasny, G. Puschner-Auer, H. Holzmann, S.L. Allison, C.W. Mandl, and C. Kunz. 1994. Structural changes and functional control of the tick-borne encephalitis virus glycoprotein E by the heterodimeric association with protein prM. *Virology* 198: 109-117.
- Henchal E.A., and J.R. Putnak. 1990. The dengue viruses. *Clin. Microbiol. Rev.* 3: 376-396. Review.
- Henchal E.A., M.K. Gentry, J.M. McCown, and W.E. Brandt. 1982. Dengue virus-specific and flavivirus group determinants identified with monoclonal antibodies by indirect immunofluorescence. *Am. J. Trop. Med. Hyg.* 31: 830-836.
- Henrich S., A. Cameron, G.P. Bourenkov, R. Kiefersauer, R. Huber, I. Lindberg, W. Bode, and M.E. Than. 2003. The crystal structure of the proprotein processing proteinase furin explains its stringent specificity. *Nat. Struct. Biol.* 10: 520-526.
- Hilgard P., and R. Stockert. 2000. Heparan sulfate proteoglycans initiate dengue virus infection of hepatocytes. *Hepatology* 32: 1069-1077.
- Hober D., L. Poli, B. Roblin, P. Gestas, E. Chungue, G. Granic, P. Imbert, J.L. Pecarere, R. Vergez-Pascal, and P. Watre. 1993. Serum levels of tumor necrosis factor α (TNF α), interleukin-6 (IL-6), and interleukin-1 β (IL-1 β) in dengue infected patients. *Am. J. Trop. Med. Hyg.* 48: 324-331.
- Horimoto T. and Y. Kawaoka. 2001. Pandemic threat posed by avian influenza A viruses. *Clin. Microbiol. Rev.* 14: 129-149.
- Hung J.J., M.T. Hsieh, M.J. Young, C.L. Kao, C.C. King, and W. Chang. 2004. An external loop region of domain III of dengue virus type 2 envelope protein is involved in serotype-specific binding to mosquito but not mammalian cells. *J. Virol.* 78: 378-388.
- Hung S.L., P.L. Lee, H.W. Chen, L.K. Chen, C.L. Kao, and C.C. King. 1999. Analysis of the steps involved in Dengue virus entry into host cells. *Virology* 257: 156-167.
- Iacono-Connors L.C., J.F. Smith, T.G. Ksiazek, C.L. Kelley, and C.S. Schmaljohn. 1996. Characterization of Langkat virus antigenic determinants defined by monoclonal antibodies to E, NS1 and prM and identification of a protective, non-neutralizing prM-specific monoclonal antibody. *Virus Res.* 43: 125-136.

- Igarashi A. 1987. Isolation of a Singh's *Aedes albopictus* cell clone sensitive to dengue and chikungunya viruses. *J. Gen. Virol.* 40: 531-544.
- Kaufman B.M., P.L. Summers, D.R. Dubois, W. Houston Cohen, M.K. Gentry, R.L. Timchak, D.S. Burke, and K.H. Eckels. 1989. Monoclonal antibodies for dengue virus prM glycoprotein protect mice against lethal dengue infection. *Am. J. Trop. Med. Hyg.* 41: 576-580.
- Keelapang P., R. Sriburi, S. Supasa, N. Panyadee, A. Songjaeng, A. Jairungsri, C. Puttikhunt, W. Kasinrerak, P. Malasit, and N. Sittisombut. 2004. Alterations of pr-M cleavage and virus export in pr-M junction chimeric dengue viruses. *J. Virol.* 78: 2367-2381
- Kliks S.C., S. Nimmanitya, A. Nisalak, and D.S. Burke. 1988. Evidence that maternal dengue antibodies are important in the development of dengue hemorrhagic fever in infants. *Am. J. Trop. Med. Hyg.* 38: 411-419.
- Klimpel K.R., S.S. Molloy, G. Thomas, and S.H. Leppla. 1992. Anthrax toxin protective antigen is activated by a cell surface protease with the sequence specificity and catalytic properties of furin. *Proc. Natl. Acad. Sci. USA.* 89: 10277-10281.
- Konishi E., and P.W. Mason. 1993. Proper maturation of Japanese encephalitis virus envelope glycoprotein requires cosynthesis with the premembrane protein. *J. Virol.* 67: 1672-1675.
- Krysan D.J., N.C. Rockwell, and R.S. Fuller. 1999. Quantitative characterization of furin specificity: Energetics of substrate discrimination using an internally consistent set of hexapeptidyl methylcoumarinamides. *J. Biol. Chem.* 274: 23229-23234.
- Kuhn R.J., W. Zhang, M.G. Rossmann, S.V. Pletnev, J. Corver, E. Lenches, C.T. Jones, S. Mukhopadhyay, P.R. Chipman, E.G. Strauss, T.S. Baker, and J.H. Strauss. 2002. Structure of dengue virus: Implications for flavivirus organization, maturation, and fusion. *Cell* 108: 717-725.
- Kuno G., G.-J.J. Chang, K.R. Tsuchiya, N. Karabatsos, and C.B. Cropp. 1998. Phylogeny of the genus *Flavivirus*. *J. Virol.* 72: 73-83.

- Kurane I., A.L. Rothman, P.G. Livingston, S. Green, S.J. Gagnon, J. Janus, B.L. Innis, S. Nimmannitya, A. Nisalak, and F.A. Ennis. 1994. Immunopathologic mechanisms of dengue hemorrhagic fever and dengue shock syndrome. *Arch. Virol. (Suppl.)* 9: 59-64. Review.
- Kurane I., and T. Takasaki. 2001. Dengue fever and dengue haemorrhagic fever: challenges of controlling an enemy still at large. *Rev. Med. Virol.* 11: 301-311.
- Lamango N.S., E. Apletalina, J. Liu, and I. Lindberg. 1999. The proteolytic maturation of prohormone convertase 2 (PC2) is a pH-driven process. *Arch. Biochem. Biophys.* 362: 275-282.
- Leduc R., S.S. Molloy, B.A. Thorne, and G. Thomas. 1992. Activation of human furin precursor processing endoprotease occurs by an intramolecular autoproteolytic cleavage. *J. Biol. Chem.* 267: 14304-14308.
- Lei H.Y., T.M. Yeh, H.S. Liu, Y.S. Lin, S.H. Chen, and C.C. Liu. 2001. Immunopathogenesis of dengue virus infection. *J. Biomed. Sci.* 8: 377-388. Review.
- Lewis, J.A., G.J. Chang, R.S. Lanciotti, R.M. Kinney, L.W. Mayer, and D.W. Trent. 1993. Phylogenetic relationships of dengue-2 viruses. *Virology* 197: 216-224.
- Lin Y., H. Lei, T. Yeh, S. Chen, and H. Liu. 2002. Heparin inhibits dengue-2 virus infection of five human liver cell lines. *Antivirus Res.* 56: 93.
- Lindenbach B.D., and C.M. Rice. 2001. *Flaviviridae: The viruses and their replication.* In D.M. Knipe, P.M. Howley, D.E. Griffin, R.A. Lamb, M.A. Martin, B. Roizman, and S.E. Strauss (ed.), *Fields' virology*, 4th ed. Lippincott Williams & Wilkins, Philadelphia. Pp. 991-1041.
- Lok S.M., M.L. Ng, and J.G. Aaskov. 2001. Amino acid and phenotypic changes in dengue 2 virus associated with escape from neutralisation by IgM antibody. *J. Med. Virol.* 65: 315-323.
- Lorenz I.C., S.L. Allison, F.X. Heinz, and A. Helenius. 2002. Folding and dimerization of tick-borne encephalitis virus envelope proteins prM and E in the endoplasmic reticulum. *J. Virol.* 76: 5480-5491.

- Lusson J., S. Benjannet, J. Hamelin, D. Savaria, M. Chretien, and N.G. Seidah. 1997. The integrity of the RRGDL sequence of the proprotein convertase PC1 is critical for its zymogen and C-terminal processing and for its cellular trafficking. *Biochem. J.* 326: 737-744.
- Mason P.W. 1989. Maturation of Japanese encephalitis virus glycoproteins produced by infected mammalian and mosquito cells. *Virology* 169: 262-267.
- Matthews D.J., K.I. Shennan, A.J. Seal, N.A. Taylor, A. Colman, and K. Docherty. 1994. Autocatalytic maturation of the prohormone convertase PC2. *J. Biol. Chem.* 269: 588-592.
- Modis Y., S. Ogata, D. Clements, and S.C. Harrison. 2003. A ligand-binding pocket in the dengue virus envelope glycoprotein. *Proc. Natl. Acad. Sci. USA.* 100: 6986-6991.
- Molloy S.S., E.D. Anderson, F. Jean, and G. Thomas. 1999. Bi-cycling the furin pathway: from TGN localization to pathogen activation and embryogenesis. *Trend. Cell Biol.* 9: 28-35.
- Molloy S.S., P. A. Bresnahan, S. H. Leppla, K.R. Klimpel, and G. Thomas. 1992. Human furin is a calcium-dependent serine endoprotease that recognizes the sequence Arg-X-X-Arg and efficiently cleaves anthrax toxin protective antigen. *J. Biol. Chem.* 267: 16396-16402.
- Monath T.P. 1994. Dengue: the risk to developed and developing countries. *Proc. Natl. Acad. Sci. USA.* 91: 2395-2400.
- Morikawa Y., E. Barsov, and I. Jones. 1993. Legitimate and illegitimate cleavage of human immunodeficiency virus glycoproteins by furin. *J. Virol.* 67: 3601-3604.
- Morsy J., W. Garten, and R. Rott. 1994. Activation of an influenza virus A/Turkey/Oregon/71 HA insertion variant by the subtilisin-like endoprotease furin. *Virology* 202: 988-991.
- Murray J.M., J.G. Aaskov, and P.J. Wright. 1993. Processing of the dengue virus type 2 proteins prM and C-prM. *J. Gen. Virol.* 74: 175-182.
- Nakagawa T., K. Murakami, and K. Nakayama. 1993. Identification of an isoform with an extremely large Cys-rich region of PC6, a Kex2-like processing endoprotease. *FFBS Lett.* 327: 165-171.

- Nakayama K. 1997. Furin: a mammalian subtilisin/Kex2p-like endoprotease involved in processing of a wide variety of precursor proteins. *Biochem. J.* 327: 625-635.
- Navarro-Sanchez E., R. Altmeyer, A. Amara, O. Schwartz, F. Fieschi, J.-L. Virelizier, F. Arenzano-Seisdedos, and P. Despres. 2003. Dendritic-cell-specific ICAM3 grabbing non-integrin is essential for the productive infection of human dendritic cells by mosquito-cell-derived dengue viruses. *EMBO Rep.* 4: 723-728.
- Plaimauer B., G. Mohr, W. Wernhart, M. Himmelspach, F. Dorner, and U. Schlokot. 2001. 'Shed' furin: mapping of the cleavage determinants and identification of its C-terminus. *Biochem. J.* 354: 689-695.
- Preugschat F., C-W. Yao, and J.H. Strauss. 1990. In vitro processing of dengue virus type 2 nonstructural proteins NS2A, NS2B and NS3. *J. Virol.* 64: 4363-4374.
- Randolph V.B., G. Winkler, and V. Stollar. 1990. Acidotropic amines inhibit proteolytic processing of Flavivirus prM protein. *Virology* 174: 450-458.
- Raviprakash K., T.J. Kochel, D. Ewing, M. Simmons, I. Phillips, C.G. Hayes, and K.R. Porter. 2000. Immunogenicity of dengue virus types 1 DNA vaccine expressing truncated and full length envelope protein. *Vaccine* 18: 2423-2434.
- Rey F.A. 2003. Dengue virus envelope glycoprotein structure: New insight into its interactions during viral entry. *Proc. Natl. Acad. Sci. USA.* 100: 6899-6901.
- Rey F.A., F.X. Heinz, C. Mandl, C. Kunz, and S.C. Harrison. 1995. The envelope glycoprotein from tick-borne encephalitis virus at 2 Å resolution. *Nature* 375: 291-298.
- Rice C.M. 1996. *Flaviviridae: The virus and their replication.* In D.M. Knipe, P.M. Howley, D.E. Griffin, R.A. Lamb, M.A. Martin, B. Roizman, and S.E. Strauss (ed.). *Fields' virology* 4th ed. Lippincott-Raven Publisher, Philadelphia. Pp. 931-959.
- Rico-Hesse R., L.M. Harrison, R.A. Salas, D. Tovar, A. Nisalak, C. Ramos, J. Boshell, M.T. de Mesa, R.M. Nogueira, and A.T da Rosa. 1997. Origins of dengue type 2 viruses associated with increased pathogenicity in the Americas. *Virology* 230: 244-251.

- Riehle M.A., S.F. Garczynski, J.W. Crim, C.A. Hill and M.R. Brown. 2002. Neuropeptides and peptide hormones in *Anopheles gambiae*. *Science* 298: 172-175.
- Rigau-Perez J.G., D.J. Gubler, A.V. Vorndam and G.G. Clark. 1997. Dengue: a literature review and case study of travelers from the United States, 1986-1994. *J. Travel Med.* 1;4(2): 65-71.
- Rigau-Perez J.G., G.G. Clark, D.J. Gubler, P. Reiter, E.J. Sanders and A.V. Vorndam. 1988. Dengue and dengue haemorrhagic fever. *Lancet* 352 (9132): 971-977.
- Rockwell N.C., D.J. Krysan, T. Komiyama, and R.S. Fuller. 2002. Precursor processing by kex2/furin proteases. *Chem. Rev.* 102: 4525-4548.
- Roebroek A.J., J.W. Creemers, I.G. Pauli, T. Bogaert and W.J. Van de Ven. 1993. Generation of structural and functional diversity in furin-like proteins in *Drosophila melanogaster* by alternative splicing of the Dfur1 gene. *EMBO. J.* 12: 1853-1870.
- Roebroek A.J., J.W. Creemers, I.G. Pauli, U. Kurzik-Dumke, M. Rentrop, E.A. Gateff, J.A. Leunissen, and W.J. Van de Ven. Cloning and functional expression of Dfurin2, a subtilisin-like proprotein processing enzyme of *Drosophila melanogaster* with multiple repeats of a cysteine motif. *J. Biol. Chem.* 1992. 267: 17208-17215.
- Roehrig J.T., A.R. Hunt, A.J. Johnson, and R.A. Hawkes. 1989. Synthetic peptides derived from the deduced amino acid sequence of the E-glycoprotein of Murray Valley encephalitis virus elicit antiviral antibody. *Virology* 171: 46-60.
- Roehrig J.T., R.A. Bolin, and R.G. Kelly. 1998. Monoclonal antibody mapping of the envelope glycoprotein of the dengue 2 virus, Jamaica. *Virology* 246: 317-328.
- Rohm C., T. Horimoto, Y. Kawaoka, J. Suss, and R.G. Webster. 1995. Do hemagglutinin genes of highly pathogenic avian influenza viruses constitute unique phylogenetic lineages?. *Virology* 209: 664-670.
- Rothman A.L., and F.A. Ennis. 1999. Immunopathogenesis of dengue hemorrhagic fever. *Virology* 257: 1-6.

- Sangkawibha N., S. Rojanasuphot, S. Ahandrik, S. Viriyapongse, S. Jatanasen, V. Salitul, B. Phanthumachinda, and S.B. Halstead. 1984. Risk factors in dengue shock syndrome: a prospective epidemiological study in Rayong, Thailand I: the 1980 outbreak. *Am. J. Epidemiol.* 120: 653-669.
- Schalich J., S.L. Allison, K. Stiasny, C.W. Mandl, C. Kunz, and F.X. Heinz. 1996. Recombinant subviral particles from tick-borne encephalitis virus are fusogenic and provide a model system for studying flavivirus envelope glycoprotein functions. *J. Virol.* 70: 4549-4557.
- Seidah N.G., M. Chretien, and R. Day. 1994. The family of subtilisin/kexin like pro-protein and pro-hormone convertases: divergent or shared functions. *Biochimie.* 76: 197-209.
- Shinde U., and M. Inouye. 1993. Intramolecular chaperones and protein folding. *Trend. Biochem. Sci.* 18: 442-446.
- Siezen R.J., J.W. Creemers, and W.J. Van de Ven. 1994. Homology modeling of the catalytic domain of human furin. A model for the eukaryotic subtilisin-like proprotein convertases. *Eur. J. Biochem.* 222: 255-266.
- Sriburi R., P. Keelapang, T. Duangchinda, S. Pruksakorn, N. Maneekarn, P. Malasit, and N. Sittisombut. 2001. Construction of infectious dengue 2 cDNA clones using high copy number plasmid. *J. Virol. Meth.* 92: 71-82.
- Stadler K., S.L. Allison, J. Schalich, and F.X. Heinz. 1997. Proteolytic activation of tick-borne encephalitis virus by furin. *J. Virol.* 71: 8475-8481.
- Steiner D.F. 1998. The proprotein convertases. *Curr. Opin. Chem. Biol.* 2: 31-39.
- Stiasny K., S.L. Allison, A. Marchler-Bauer, C. Kunz, and F.X. Heinz. 1996. Structural requirements for low-pH-induced rearrangements in the envelope glycoprotein of tick-borne encephalitis virus. *J. Virol.* 70: 8142-8147.
- Strauss J.H., and E.G. Strauss. 1994. The alphaviruses: gene expression, replication and evolution. *Microbiol. Rev.* 58: 491-562.
- Subbarao K., A. Klimov, J. Katz, H. Regnery, W. Lim, H. Hall, M. Perdue, D. Swayne, C. Bender, J. Huang, M. Hemphill, T. Rowe, M. Shaw, X. Xu, K. Fukuda, and N. Cox. 1998. Characterization of an avian influenza A (H5N1) virus isolated from a child with a fatal respiratory illness. *Science* 279: 393-396.

- Takahashi S., K. Kasai, K. Hatsuzawa, N. Kitamura, Y. Misumi, Y. Ikehara, K. Murakami, and K. Nakayama. 1993. A mutation of furin causes the lack of precursor-processing activity in human colon carcinoma LoVo cells. *Biochem. Biophys. Res. Comm.* 195: 1019-1026.
- Takahashi S., T. Nakagawa, T. Banno, T. Watanabe, K. Murakami, and K. Nakayama. 1995. Localization of furin to the *trans*-Golgi network and recycling from the cell surface involves Ser and Tyr residues within the cytoplasmic domain. *J. Biol. Chem.* 270: 28397-28401.
- Tassaneetrithep B., T.H. Burgess, A. Granelli-Piperno, C. Trumpfheller, J. Finke, W. Sun, M.A. Eller, K. Pattanapanyasat, S. Sarasombath, D.L. Birx, R.M. Steinman, S. Schlesinger, and M.A. Marovich. 2003. DC-SIGN (CD209) mediates dengue virus infection of human dendritic cells. *J. Exp. Med.* 197: 823-829.
- Thomas G. 2002. Furin at the cutting edge: from protein traffic to embryogenesis and disease. *Nat. Rev. Mol. Cell Biol.* 3: 753-766.
- Ueda K., G.M. Lipkind, A. Zhou, X. Zhu, A. Kuznetsov, L. Philipson, P. Gardner, C. Zhang, and D.F. Steiner. 2003. Mutational analysis of predicted interactions between the catalytic and P domains of prohormone convertase 3 (PC3/PC1). *Proc. Natl. Acad. Sci. USA.* 100: 5622-5627.
- Van de Ven W.J., A.J. Roebroek, and H.L. van Duijnhoven. 1993. Structure and function of eukaryotic proprotein processing enzymes of the subtilisin family of serine proteases. *Crit. Rev. Oncog.* 4: 115-136.
- Vazquez S., M.G. Guzman, G. Guillen, G. Chinae, A.B. Perez, M. Pupoa, R. Rodriguez, O. Reyes, H.E. Garay, I. Delgado, G. Garcia, and M. Alvarez. 2002. Immune response to synthetic peptides of dengue prM protein. *Vaccine* 20: 1823-1830.
- Walker J.A., S.S. Molloy, G. Thomas, T. Sakaguchi, T. Yoshida, T.M. Chambers, and Y. Kawaoka. 1994. Sequence specificity of furin, a proprotein-processing endoprotease, for the hemagglutinin of a virulent avian influenza virus. *J Virol.* 68: 1213-1218.

- Wengler G., and G. Wengler. 1989. Cell-associated West Nile flavivirus is covered with E + pre-M protein heterodimers which are destroyed and reorganized by proteolytic cleavage during virus release. *J. Virol.* 63: 2521-2526.
- Wengler G., and G. Wengler. 1991. The carboxy-terminal part of the NS3 protein of the West Nile flavivirus can be isolated as a soluble protein after proteolytic cleavage and represents an RNA-stimulated NTPase. *Virology* 184: 707-715.
- Westaway E.G. 1966. Assessment and application of a cell line from pig kidney for plaque assay and neutralization tests with twelve group B arboviruses. *Am. J. Epidemiol.* 84: 439-456.
- Zhang Y., J. Corver, P.R. Chipman, W. Zhang, S.V. Pletnev, D. Sedlak, T.S. Baker, J.H. Strauss, R.J. Kuhn, and M.G. Rossmann. 2003. Structures of immature flavivirus particles. *EMBO. J.* 22: 2604-2613.
- Zhong M., S. Benjannet, C. Lazure, S. Munzer, and N.G. Seidah. 1996. Functional analysis of human PACE4-A and PACE4-C isoforms: identification of a new PACE4-CS isoform. *FFBS Lett.* 396: 31-36.
- Zhou A., G. Webb, X. Zhu, and D.F. Steiner. 1999. Proteolytic processing in the secretory pathway. *J. Biol. Chem.* 274: 20745-20748.
- Zhou A., L. Paquet, and R.E. Mains. 1995. Structural elements that direct specific processing of different mammalian subtilisin-like prohormone convertases. *J. Biol. Chem.* 270: 21509-21516.
- Zhou A., S. Martin, G. Lipkind, J. Lamendola, and D.F. Steiner. 1998. Regulatory roles of the P domain of the subtilisin-like prohormone convertases. *J. Biol. Chem.* 273: 11107-11114.