

Curriculum Vitae

Name: Thomas Henrik Bugge, Ph.D.

Date: March 2003

Date and Place of Birth: February 17, 1962, Copenhagen, Denmark

Citizenship: Danish (U.S. Permanent Resident)

Education:

- 1989 M.Sc., Molecular Biology, The Institute of Microbiology, University of Copenhagen, Copenhagen, Denmark.
- 1993 Ph.D., Molecular Biology, European Molecular Biology Laboratory (EMBL), Heidelberg, Germany.

Brief Chronology of Employment:

- 1987-1989 Pregraduate (M.Sc.) student, Laboratory of Tumor Virology, The Fibiger Institute, Copenhagen, Denmark.
- 1990-1993 Graduate studies in molecular biology, EMBL, Heidelberg, Germany.
- 1993-1995 Postdoctoral Fellow, The Finsen Laboratory, State University Hospital, Copenhagen, Denmark/ Children's Hospital Research Foundation, Cincinnati, Ohio.
- 1995-1996 Research Leader, The Finsen Laboratory, State University Hospital, Copenhagen, Denmark.
- 1997-1999 Associate Professor of Pediatrics, Children's Hospital Research Foundation, Cincinnati, Ohio.
- 1999-present Chief, Proteases and Tissue Remodeling Unit, Oral and Pharyngeal Cancer Branch, National Institute of Dental and Craniofacial Research, National Institutes of Health, Bethesda, MD.

Honors and Other Special Scientific Recognition:

- 1988-1989 Pregraduate Fellowship, The Danish Cancer Society, Copenhagen, Denmark.
- 1990-1993 Predoctoral Fellowship, EMBL, Heidelberg, Germany.
- 1990-1991 Travel Grant, The Danish Research Academy, Aarhus, Denmark.
- 1991-1992 Travel Grant, The Danish Research Academy, Aarhus, Denmark.
- 1993-1993 Fellowship, The Danish Cancer Research Foundation, Copenhagen, Denmark.

1993-1994	Travel Grant, The Danish Plasmid Foundation, Glostrup, Denmark.
1994 -1995	Senior Researcher, The Danish Medical Research Council, Denmark.
1996	Received the "1996 Creativity Award" at the XIII th International Congress on Fibrinolysis and Thrombolysis, Barcelona, Spain.
1999	Abstract Selection Committee, "The First Meeting of the International Proteolysis Society", Mission Point Resort, Mackinac Island, MI.
1999	Co-organizer, "The First Meeting of the International Proteolysis Society", Mission Point Resort, Mackinac Island, MI.
1999	Nominated for the "International Society for Fibrinolysis and Thrombolysis (ISTF) Prize 2000".
2002	Discussion Moderator "Forbeck Symposium on Proteases as Cancer Therapeutic Targets" Captiva Island, FL.
2002	Scientific Advisory Board, "The Second Meeting of the International Proteolysis Society", Munich, Germany.
2002	Session Chair, Proteolysis in Cancer, "The Second Meeting of the International Proteolysis Society", Munich, Germany.
2002	Ad Hoc Reviewer, Promotion of Li Zhang to Associate Scientist, Department of Vascular Biology, American Red Cross, Rockville, M.D.
2002	Ad Hoc Reviewer, Promotion of Dr. Shijie Sheng, Department of Pathology, Wayne State University to Associate Professor with Tenure, Detroit, MI.
2005	Organizer (with Dudley Strickland, Toni Antalis, and Dan Lawrence) "The Xth International Workshop on Molecular and Cellular Biology of Plasminogen Activation", Washington, D.C.

Editorial Recognition of Research Publications

1. Vassalli, J.-D. and Saurat, J. H. (1996). Cuts and scrapes? Plasmin heals! *Nature Medicine*, **2**, 284.
2. Mosesson. M. W. (2000). Fibrinogen as a determinant of the metastatic potential of tumor cells. *Blood*, **96**, 3301.
3. Pawlak, S. and Strickland, S. (2002). Tissue plasminogen activator and seizures: a clot-buster's secret life. *J. Clin. Invest.*, **109**, 1529-1531.
4. Hutchinson, E. (2003). Mass destruction. *Nature Reviews Cancer*, **3**, 82.
5. Brown, H. (2003). Engineered anthrax toxin has potent antitumour activity. *Lancet Oncology*, **4**, 64.

Invited lectures and presentations since 1995:

1995

Bristol-Myers Squibb Lecture, Annual Meeting, Danish Cancer Research Society, Copenhagen, Denmark.

1996

Plenary Lecture, 2nd Joint Meeting of the Wound Healing Society & The European Tissue Repair Society, Boston, MA.

Prize Lecture, XIIIth International Congress on Fibrinolysis and Thrombolysis, Barcelona, Spain.

1996 Gordon Conference on Proteolytic Enzymes and their Inhibitors. New London, NH.

Seminar Speaker, The Danish Biological Society, Copenhagen, Denmark.

Seminar Speaker, Institute of Microbiology, University of Copenhagen, Copenhagen, Denmark.

Seminar Speaker, Tulane Medical School, Department of Biochemistry, New Orleans, LA.

1997

Seminar Speaker, Stony Brook, Department of Immunology and Pathology, Stony Brook, NY.

Seminar Speaker, Arris Pharmaceuticals, South San Francisco, CA.

Seminar Speaker, Uniklinik Freiburg, University of Freiburg, Freiburg, Germany.

Seminar Speaker, Differentiation Programme, EMBL, Heidelberg, Germany.

Seminar Speaker, State University Hospital, Copenhagen, Denmark.

Plenary Speaker, 17th International Congress of Biochemistry and Molecular Biology/American Society of Biochemistry and Molecular Biology, San Francisco, CA.

Seminar Speaker, Roche Bioscience, Palo Alto, CA.

1998

Seminar Speaker, Affinity Group Seminar Series, Scripps Research Institute, San Diego, CA.

Seminar Speaker, Department of Vascular Biology, American Red Cross, Rockville, MD.

Seminar Speaker, The Burnham Institute, Department of Cell Adhesion-Extracellular Matrix Biology, San Diego, CA.

Seminar Speaker, "Molecular Medicine Seminar Series", University of Umea, Umea, Sweden.

Seminar Speaker, American Association for Cancer Research and ACTA Pathologica MicrobiologidamnunologisScandinavia meeting “ProteaseandProteaseInhibitors in Cancer”, Nyborg, Denmark.

Seminar Speaker, State University Hospital, Copenhagen, Denmark.

1999

Seminar Speaker, The National Institute of Dental and Craniofacial Research, The National Institutes of Health, Bethesda, MD.

Grand Rounds Speaker, Karmanos Cancer Institute, Wayne State University, Detroit, MI.

Speaker, Developmental Biology Protease Symposium, Wayne State University, Detroit, MI.

Speaker, Protease Consortium Meeting, Vanderbilt University, Nashville, TN.

Speaker, Melbourne Matrix Metalloproteinase Mini-Symposium, Melbourne, Australia.

Seminar Speaker, Craniofacial Development and Regeneration Branch, National Institute of Dental and Craniofacial Research, National Institutes of Health, Bethesda, MD.

Seminar Speaker, Oral Infection and Immunity Branch, National Institute of Dental and Craniofacial Research, National Institutes of Health, Bethesda, MD.

Seminar Speaker, Gene Therapy and Therapeutics Branch, National Institute of Dental and Craniofacial Research, National Institutes of Health, Bethesda, MD.

2000

Seminar Speaker, Entremed, Rockville, MD.

Seminar Speaker, Novo/Nordisk A/S, Maaloev, Denmark.

Seminar Speaker, State University Hospital, Copenhagen, Denmark.

2001

Seminar Speaker, Corvas International, Inc., San Diego, CA.

Seminar Speaker, Department of Vascular Biology, American Red Cross.

2002

Seminar Speaker, Oral Infection and Immunity Branch, National Institute of Dental and Craniofacial Research, National Institutes of Health, Bethesda, MD.

Seminar Speaker, Laboratory of Cellular Carcinogenesis and Tumor Promotion, National Cancer Institute, Bethesda, MD.

Seminar Speaker, Lombardi Cancer Center, Georgetown University Medical Center, Washington, D. C.

Seminar Speaker, Gordon Conference on Proteolytic Enzymes and Their Inhibitors, New London, NH.

Seminar Speaker, American Association for Cancer Research, Proteases, Extracellular Matrix and Cancer, Hilton Head, SC.

Seminar Speaker, "Peptide Toxins Targeted to Cancer Symposium: Experience from animal studies and clinical trials". Copenhagen, Denmark.

Seminar Speaker, State University Hospital, Copenhagen, Denmark.

Speaker, National Cancer Institute-sponsored workshop on "Proteases and Cancer: Biology and Clinical Applications Workshop", Bethesda, MD.

Speaker, Immunology /Cell Biology Seminar series, NCI-Frederick, Frederick, MD.

2003

Speaker, Celera, South San Francisco, CA.

Seminar Speaker, 47th Annual Meeting of the Society of Thrombosis and Haemostasis Research, Innsbruck, Austria.

Seminar Speaker, EMBL, Monterotondo, Italy.

Grants

- | | |
|------------|--|
| 1995-1996 | Vera and Carl Johan Michaelsen Foundation Grant, " Investigation of the Molecular mechanisms of cancer invasion and metastasis by gene targeting", \$20,000. |
| 1997-1998 | Board of Trustees Grant, Children's Hospital Research Foundation, "Determination of the role of the plasminogen activation system in cancer invasion and metastasis by tumor transplantation studies in plasminogen-deficient mice", \$80,000. |
| 1997- 2001 | Danish Medical Research Council, "Transgenic molecular genetic analysis of the function and interaction of matrix degrading protease systems in tissue remodeling and cancer invasion", \$29,000. |
| 1998-2003 | NIH/NCI, RO1, CA79994-01, "Coagulation and Fibrinolysis in Tumor Progression". (Initial Review Group Priority Score 133, Percentile 1.4) Total Direct Costs: \$750,786. Grant relinquished after the transfer of research program to the NIH Intramural Program. |
| 1999-2001 | Supplement to NIH/NCI, RO1 CA79994-01, "Protease Consortium/Coagulation and Fibrinolysis in Tumor Progression." Grant relinquished after the transfer of the research program to the NIH intramural program. |
| 1999-1999 | Board of Trustees Grant, Children's Hospital Research Foundation (extension), "Determination of the role of the plasminogen activation system in cancer invasion |

- and metastasis by tumor transplantation studies in plasminogen-deficient mice”, \$6,600.
- 1999–2000 NIH/NCI, R13, CA82133-01, (Co-investigator; P.I. Dr. B. F. Sloane) “Conference of the International Proteolysis Society.” Total Direct Costs: \$7,500.
- 2002–2005 DOD/Breast Cancer Center of Excellence (Subcontract P.I.; P.I. Dr. B. F. Sloane) “Validation of Proteases as Therapeutic Targets in Breast Cancer: Functional Imaging of Protease Expression, Activity and Inhibition.” Total Direct Costs: \$5,700,000. Subcontract PTRU \$197,207.
- 2003-2005 NIAID Support of Intramural Biodefense Research from ICs other than NIAID, “Imaging Anthrax Toxin Proteolytic Activation.” Priority Score; 2nd of 65 total proposals. Estimated Total Direct Costs: \$463,016.

Administration

- 1999-present Institutional Animal Care and Use Committee, NIDCR.
- 1999-present Gene Targeting Facility Oversight Committee, NIDCR.
- 1999-present Animal Care Facility Oversight Committee, NIDCR.
- 2001-present NIH Central Vivarium Animal Research Center Core Planning Committee

Patents

First Inventor:

“In vivo imaging of cell-surface protease activity using modified anthrax toxins.” DHHS Ref No. E-295-01/0 (Co-inventors, Dr. Shi-Hui Liu, Dr. Steven Leppla, and David Mitola). *Pending*

Co-inventor:

“Mutated anthrax toxin protective antigen proteins that specifically target cells containing high amounts of cell-surface metalloproteinases or plasminogen activator receptors.” DHHS Ref No.E-293-99/1; PCT/US00/26192. First Inventor: Steven Leppla. *Pending*

Editorial Boards

- 2002-present Handling Editor, Thrombosis and Haemostasis.
- 2003-present Editorial Board, Oral Oncology.

Study Sections

- 2002 American Cancer Society, Cell Structure and Metastasis Committee.

2003- Congressionally Directed Medical Research Programs, Prostate Cancer Research Program, Pathobiology #2.

Ad Hoc Journal Review

American Journal of Pathology

Blood

Cancer Research

Clinical Cancer Research

EMBO Journal

International Journal of Cancer

Journal of the National Cancer Institute

Oncogene

Proceedings of the National Academy of Sciences (USA)

The Journal of Biological Chemistry

The Journal of Cell Biology

The Journal of Clinical Investigation

Thrombosis and Haemostasis

Trends in Cardiovascular Medicine

Bibliography

- 1) Andreassen H., Bohr H., Bohr J., Brunak S., Bugge T. H., Cotteril R. M. J., Jacobsen, C., Kusk, P., Lautrup, B., Petersen, S. B., Sæhrmark, T., and Ulrich, K. (1990). Analysis of the secondary structure of the human immunodeficiency virus (HIV) proteins p17, gp120, and gp41 by computer modeling based on neural networks methods. *J. AIDS*, **6**, 615-622.
- 2) Bugge, T. H., Lindhardt, B. Ø., Hansen, L. L., Kusk, P., Hulgaard, E. F., Holmbäck, K., Klasse, P. J., Zeuthen, J., and Ulrich, K. (1990). Analysis of a highly immunodominant epitope in the human immunodeficiency virus type 1 transmembrane glycoprotein, gp41, defined by a human monoclonal antibody. *J. Virol.*, **64**, 4123-4129.
- 3) Bugge, T. H., Hansen, L. L., Lindhardt, B. Ø., Kvinesdal, B., Kusk, P., Holmbäck, K., Hulgaard, E. F., and Ulrich K. (1991). Competition ELISA using a human monoclonal antibody for the detection of antibodies against human immunodeficiency virus type 1. *J. Virol. Meth.*, **32**, 1-10.

- 4) Kusk, P., Bugge, T. H., Lindhardt, B. Ø., Hulgaard, E. F., and Holmbäck, K. (1992). Mapping of linear B-cell epitopes on the major core protein p24 of human immunodeficiency virus type 1 (HIV-1). *AIDS Res. Hum. Retrovir.*, **8**, 1789-1794.
- 5) Kusk, P., Lindhardt, B. Ø., Bugge, T. H., Holmbäck, K., and Hulgaard, E. F. (1993). Mapping of a new human linear B-cell epitope on the vpu protein of the human immunodeficiency virus type 1. *J. AIDS.*, **6**, 334-338.
- 6) Holmbäck, K., Kusk, P., Hulgaard, E. F., Bugge, T. H., Scheibel, E., and Lindhardt, B. Ø. (1993). Autologous antibody response against the principal neutralizing domain of human immunodeficiency virus type 1 isolated from infected humans. *J. Virol.*, **67**, 1612-1619.
- 7) Kusk, P., Holmbäck, K., Lindhardt, B. Ø., Hulgaard, E. F., and Bugge, T. H. (1992). Mapping of two new human B-cell epitopes on HIV-1 gp120. *AIDS*, **6**, 1451-1456.
- 8) Disela, C., Glineur, C., Bugge, T. H., Sap, J., Stengl, G., Dodgson, J., Stunnenberg, H. G., Beug, H., and Zenke, M. (1991). v-erbA overexpression is required to extinguish c-erbA function in erythroid cell differentiation and regulation of the erbA target gene CA II. *Genes & Dev.*, **5**, 2033-2047.
- 9) Vivanco-Ruiz, M., Bugge, T. H., Hirchmann, P., and Stunnenberg H. G. (1991). Functional characterization of a natural retinoic acid responsive element. *EMBO J.*, **10**, 3829-3838.
- 10) Bugge, T. H., Pohl, J., Lonnoy, O., and Stunnenberg, H. G. (1992). RXR α , a promiscuous partner of retinoic acid and thyroid hormone receptors. *EMBO J.*, **11**, 1409-1418.
- 11) Baretino, D., Bugge, T. H., Bartunek, P., Vivanco-Ruiz, M., Sonntag-Buck, V., Beug, H., Zenke, M., and Stunnenberg, H. G. (1993). T₃R, but not its oncogenic variant v-erbA suppresses RAR dependent transactivation by titrating out RXR. *EMBO J.*, **12**, 1343-1354.
- 12) Islam, T. C., Bugge, T. H., and Bohm, S. (1993). The long terminal repeat of VL30 retrotransposons contains sequences that determine retinoic acid-induced transcription in cultured keratinocytes. *J. Biol. Chem.*, **268**, 3251-3259.
- 13) Bugge, T. H., Flick, M. J., Daugherty, C. C., and Degen, J. L. (1995). Plasminogen deficiency causes severe thrombosis but is compatible with development and reproduction. *Genes & Dev.*, **9**, 794-807.
- 14) Bugge, T. H., Suh, T. T., Flick, M. J., Daugherty, C. C., Rømer, J., Solberg, H., Ellis, V., Danø, K., and Degen, J. L. (1995). The receptor for urokinase-type plasminogen activator is not essential for mouse development or fertility. *J. Biol. Chem.*, **270**, 16886-16894.
- 15) Rømer, J., Bugge, T. H., Pyke, C., Lund, L. R., Flick, M. J., Degen, J. L., and Danø, K. (1996). Impaired wound healing in mice with a disrupted plasminogen gene. *Nature Medicine*, **2**, 287-292.
- 16) Rømer, J., Bugge, T. H., Pyke, C., Lund, L. R., Flick, M. J., Degen, J. L., and Danø, K. (1996). Plasminogen and wound healing (Letter to the editor). *Nature Medicine*, **2**, 725.
- 17) Bugge, T. H., Flick, M. J., Danton M. J. S., Daugherty, C. C., Danø, K., Carmeliet, P., Collen, D., and Degen J. L. (1996). Urokinase-type plasminogen activator is effective in fibrin clearance in the absence of its receptor or tissue-type plasminogen activator. *Proc. Natl. Acad. Sci. (USA)*, **93**, 5899-5904.

- 18) Bugge, T. H., Xiao, Q., Kombrinck, K., Flick, M. J., Holmbäck, K., Danton, M. J. S., Colbert, M. C., Witte, D. P., Davie, E. W., Fujikawa, K., and Degen, J. L. (1996). Fatal embryonic bleeding events in mice lacking the cell-associated coagulation initiator, tissue factor. *Proc. Natl. Acad. Sci. (USA)*, **93**, 6258-6263.
- 19) Bugge, T. H., Kombrinck, K., Flick, M. J., Danton, M. J. S., Daugherty, C. C., and Degen J. L. (1996). Loss of fibrinogen rescues mice from the pleiotropic effects of plasminogen deficiency. *Cell*, **87**, 709-719.
- 20) Tsirka, S. E., Rogove, A. D., Bugge, T. H., Degen, J. L., and Strickland, S. (1997). An extracellular proteolytic cascade promotes neuronal degeneration in the mouse hippocampus. *J. Neurosci.*, **17**, 543-552.
- 21) Coleman, J. L., Gebbia, J. A., Piesman, J., Degen, J. L., Bugge, T. H., and Benach, J. L. (1997). Plasminogen is required for efficient dissemination of *Borrelia burgdorferi* in ticks and for enhancement of spirochetemia in the vertebrate host. *Cell*, **89**, 1111-1119.
- 22) Tsirka, S. E., Bugge, T. H., Degen, J. L., and Strickland, S. (1997). Plasmin-mediated neuronal death demonstrates a non-fibrin substrate in the CNS. *Proc. Natl. Acad. Sci. (USA)*, **94**, 9779-9781.
- 23) Xiao, Q., Danton, M. J. S., Witte, D. P., Kowala, M. C., Valentine, M. T., Bugge, T. H., and Degen, J. L. (1997). Plasminogen-deficiency accelerates vessel wall disease in mice predisposed to atherosclerosis. *Proc. Natl. Acad. Sci. (USA)*, **94**, 10335-10340.
- 24) Bugge, T. H., Kombrinck, K. W., Xiao, Q., Holmbäck, K., Daugherty, C. C., Witte, D. P., and Degen, J. L. (1997). Growth and dissemination of Lewis lung carcinoma in plasminogen-deficient mice. *Blood*, **90**, 4522-4531.
- 25) Kao, W.-Y., Kao, C. W.-C., Kombrinck, K. W., Converse, R. L., Good, W. V., Kaufman, A. H., Bugge, T. H., and Degen, J. L. (1998). Healing of corneal epithelial defects in plasminogen and fibrinogen-deficient mice. *Investigative Ophthalmology & Visual Science*, **39**, 502-508.
- 26) Drew, A. F., Kaufman, A. H., Kombrinck, K., Danton, M. J., Daugherty, C. C., Degen, J. L., and Bugge, T. H. (1998). Ligneous conjunctivitis in plasminogen-deficient mice. *Blood*, **91**, 1616-1624.
- 27) Bugge, T. H., Lund, L. R., Kombrinck, K. W., Nielsen, B. S., Holmbäck, K., Drew, A. F., Flick, M. J., Witte, D. P., Danø, K. and Degen, J. L. (1998). Reduced metastasis of mammary cancer in plasminogen-deficient mice. *Oncogene*, **16**, 3097-3104.
- 28) Sun, Y. W., Witte, D. P., Degen, J. L., Colbert, M. C., Burkart, M., Holmbäck, K., Xiao, Q., Bugge, T. H., and Degen, S. J. F. (1998). Prothrombin deficiency results in embryonic and neonatal lethality in mice. *Proc. Natl. Acad. Sci. (USA)*, **95**, 7597-7602.
- 29) Busso, N., Péclat, V., Van Ness, K., Kolodzieszczyk, E., Degen, J. L., Bugge, T. H., and So, A. (1998). Exacerbation of antigen-induced arthritis in urokinase-deficient mice. *J. Clin. Invest.*, **102**, 41-50.
- 30) Bugge, T. H., and Degen, J. L. (1998). Plg. In *The Gene Knockout FactsBook*. (eds. Mak, T. W., Penninger, J., Roder, J., Rossant, J., and Sounders, M.), Academic Press, San Diego, CA. p876-877.

- 31) Bugge, T. H., and Degen, J. L. (1998). uPAR. In *The Gene Knockout FactsBook*. (eds. Mak, T. W., Penninger, J., Roder, J., Rossant, J., and Sounders, M.), Academic Press, San Diego, CA p1061-1062.
- 32) Bugge, T. H., and Degen, J. L. (1998). Tissue factor. In *The Gene Knockout FactsBook*. (eds. Mak, T. W., Penninger, J., Roder, J., Rossant, J., and Sounders, M.), Academic Press, San Diego, CA p1010-1011.
- 33) Gebbia, J. A., Monco, J. C. G., Degen, J. L., Bugge, T. H., and Benach, J. L. (1999). The plasminogen activation system enhances brain and heart invasion in murine relapsing fever Borreliosis. *J. Clin Invest.*, **103**, 81-87.
- 34) Chen, Z.L, Indyk, J. A., Bugge, T. H., Kombrinck, K. W., Degen, J. L., and Strickland, S. (1999). Neuronal death and blood-brain barrier breakdown after excitotoxic injury are independent processes. *J. Neurosci.*, **19**, 9813-9820.
- 35) Lund, L. R., Rømer, J., Bugge, T. H., Frandsen, T. L., Degen, J. L., Stephens, R. L., and Danø, K. (1999). Complete arrest of wound healing in plasminogen-deficient mice treated with a metalloprotease inhibitor. *EMBO J.*, **18**, 4645-4656.
- 36) Bezerra, J. A., Bugge, T. H., Melin-Aldana, H., Sabla, G., Kombrinck, K. W., Witte, D., and Degen, J. L. (1999). Impaired liver remodelling following a toxic injury in plasminogen-deficient mice. *Proc. Natl. Acad. Sci. (USA)*, **96**, 15143-15148.
- 37) List, K., Jensen, O. N., Bugge, T. H., Lund, L. R., Ploug, M., Danø, K., and Behrendt, N. (2000). Plasminogen-independent initiation of the pro-uPA activation cascade *in vivo*. Activation of pro-urokinase by glandular kallikrein (mGK-6) in plasminogen-deficient mice. *Biochemistry*, **39**, 508-515.
- 38) Drew, A. F., Schiman, H. L., Kombrinck, K. W., Bugge, T. H., Degen, J. L., and Kaufman, A. H. (2000). Persistent corneal haze after excimer laser photokeratectomy in plasminogen-deficient mice. *Invest. Ophthalmol. Vis. Sci.*, **41**, 67-72.
- 39) Wu, Y. P., Lu, W., Sung, T.-C., Frohman, M. A., Milev, P., Bugge, T. H., Degen, J. L., Margolis, R. U., and Tsirka, S. E. (2000). A novel extracellular protease and matrix pathway required for neuronal remodeling in the hippocampus. *J. Cell Biol.*, **148**, 1295-1304.
- 40) Lund, L. R., Bjørn, S. F., Sternlicht, M. D., Nielsen, B. S., Solberg, H., Autzen, P., Østerby, J., Christensen, I. J., , Stephens, R. J., Bugge, T. H., Danø, K., and Werb, Z. (1999). Lactational competence and involution of the mouse mammary gland require plasminogen. *Development*, **127**, 4481-4492.
- 41) Goguen, J. D., Bugge, T. H., and Degen, J. L. (2000). Assessing the Role of the Pleiotropic Effects of Plasminogen Deficiency in Infection Experiments with Plasminogen-deficient Mice. *Methods*, **21**, 179-183.
- 42) Drew, A. F., Tucker, H., Kombrinck, K. W., Simon, D. I., Bugge, T. H., and Degen, J. L. (2000). Plasminogen is a critical determinant of vascular remodeling in mice. *Circulation Research*, **87**, 133-139.
- 43) Palumbo, J. S., Kombrinck, K. W., Drew, A. F., Grimes, T. S., Kiser, J., Degen, J. L., and Bugge, T. H. (2000). Fibrinogen is an important determinant of the metastatic potential of circulating tumor cells. *Blood*, **96**, 3302-3309.

- 44) Bezerra, J. A., Currier, A. R., Melin-Aldana, H., Sabla, G., Bugge, T. H., Kombrinck, K. W., and Degen, J. L. (2001). Plasminogen Activators Direct Reorganization of the Liver Lobule after Acute Injury. *Am. J. Pathol.*, **158**, 921-929.
- 45) Liu, S., Bugge, T. H., and Leppla, S. H. (2001). Targeting tumor cells by urokinase plasminogen activator-activated anthrax toxin protective antigens. *J. Biol. Chem.* **276**, 17976-17984.
- 46) Engelholm, L. H., Nielsen, B. S., Netzel-Arnett, S., Solberg, S., Chen, X. D., Lopez Garcia J.S., Lopez-Otin, C., Young, M., Birkedal-Hansen, H., Danø, K., Lund, L. R., Behrendt, N., and Bugge, T. H. (2001) The urokinase plasminogen activator receptor-associated protein/Endo 180 is coexpressed with its interaction partners uPAR and matrix metalloproteinase-13 during osteogenesis. *Lab. Invest.* **10**, 1403-1414.
- 47) Yepes, M., Sandkvist, M., Coleman, T. A., Wu, J.-Y., Mitola, D., Bugge, T. H., and Lawrence, D. (2002). Regulation of seizure spreading by tissue plasminogen activator is plasminogen-independent. *J.Clin. Invest.* **109**, 1571-1578.
- 48) Bugge, T. H. (2002). Proteolysis in carcinogenesis. In "Head and Neck Cancers", Eds. Gutkind, J. S., Jacobs J. R., and Lippman, S. M., Academic Press, San Diego, CA.
- 49) Frankel, A. E., Bugge, T. H., Vallera, D. A., and Leppla, S. H. (2002) Peptide toxins directed at matrix dissolution systems of cancer cells. *Protein and Peptide Lett.*, **9**, 1-14.
- 50) List, K., Haudenschild, C. C., Engelholm, L. H., Behrendt, N., and Bugge, T. H. (2002). Matriptase/MT-SP1 is required for postnatal survival, epidermal barrier function, hair follicle development, and thymic homeostasis. *Oncogene*, **21**, 3765-3779.
- 51) Bannach, F. G., Fowler, B. J., Gutierrez, A., Bugge, T. H., Degen, J. L., Parmer, R. J., and Miles, L. A. (2002). Characterization of the murine plasminogen promoter. *J. Biol. Chem.* **277**, 38579-38588.
- 52) Netzel-Arnett, S. A., Mitola, D. J., Chrysovergis, K., Holmbeck, K., Birkedal-Hansen, H. and Bugge, T. H. (2002). Collagen Dissolution by Keratinocytes Requires Cell Surface Plasminogen Activation and Matrix Metalloproteinase Activity. *J. Biol. Chem.*, **277**, 45154-45161.
- 53) Curino, A., Mitola, D., Aaronson H., Raja, K., Keegan, A., McMahon, G., Lawrence, D. A, and Bugge, T. H. (2002). Plasminogen promotes sarcoma growth and suppresses the accumulation of tumor-infiltrating macrophages. *Oncogene*, **21**, 8830-8842.
- 54) Montaner, S., Sodhi, A., Molinolo, A., Bugge, T. H., Sawai, E. T., Ye, Y., Ray, P. E., and Gutkind, J. S. (2003). Development of Kaposi-like Lesions in Mice by Endothelial-Specific Retroviral Transduction of Kaposi's Sarcoma Virus Oncogenes. *Cancer Cell*, **3**, 23-36.
- 55) Liu, S., Aaronson, H., Mitola, D., Leppla, S. H., and Bugge, T. H. (2003). Potent anti-tumor activity of a urokinase-activated engineered anthrax toxin. *Proc. Natl. Acad. Sci. (USA)*, **100**, 657-662.
- 56) Netzel-Arnett, S., Hooper, J. D., Szabo, R., Madison, E. L., Quigley, J. P., Bugge, T. H. and Antalis, T. M. (2003). Membrane Anchored Serine Proteases: An emerging class of cell surface proteolytic enzymes with potential roles in cancer. *In Press, Cancer and Metastasis Reviews*.
- 57) Engelholm, L. H., List, K., Netzel-Arnett, S., Cukierman, E., Mitola, D. J., Aaronson, H., Kjøller, L., Yamada, K. M., Strickland, D. S., Holmbäck, K., Danø, K., Birkedal-Hansen, H., Behrendt, N.,

and Bugge T. H. (2003). uPARAP/Endo180 is a fibroblast adhesion and internalization receptor for collagen. *In Press, J. Cell Biol.*

58) Pedersen, T. X., Leethanakul, C, Patel V, Mitola, D. J., Danø, K., Johnsen, M., Gutkind, J. S., and Bugge, T. H. (2003). Laser capture microdissection-based *in vivo* genomic profiling of wound keratinocytes identifies similarities and differences to squamous cell carcinoma. *In Press, Oncogene.*

59) Szabo, R., Qingyu Wu, Q., Dickson, R. B., Netzel-Arnett, S, Antalis, T. M., and Bugge, T. H. (2003). Type II Transmembrane Serine Proteases. *In Press, Thrombosis and Haemostasis.*

60) Frankel, A. F., Neville, D. M., Bugge, T.H., Kreitman, R. J., Leppla, S. H. (2003) Immunotoxin therapy of hematologic malignancies. *Submitted.*

61) Liu, S. Schubert, R. L. Bugge, T. H., and Leppla, S. H. (2003). Anthrax toxin: structures, functions, and tumor targeting. *Submitted.*

62) List, K., Szabo, R., Wertz, P.W., Segre, J., Haudenschild, C. C., Kim, S.-Y., Behrendt, N., and Bugge, T. H. (2003). Loss of proteolytically processed filaggrin and ichthyosis caused by epidermal deletion of Matriptase/MT-SP1. *In preparation.*