Richard H. Gomer

Title: Thomas Powell '62 Professor of Science

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Education: Pomona College, Claremont, California, B.A. (Physics), 1977
University of Chicago, Chicago, Illinois, Organic Chemistry class, Summer 1977
California Institute of Technology, Pasadena, California, Ph.D. (Biology), 1983

Major Awards:

Investigator, Howard Hughes Medical Institute, 1990 (an NRC 'highly prestigious' award; nominations from all universities in the US, selected by committee)
Inventor of the Year, State Bar of Texas, 2011 (nominations from all attorneys in Texas, selected by committee)
Elected Fellow, American Academy of Microbiology, 2016 (nominations by microbiologists in the US, selected by committee)
Texas A&M University Association of Former Students Distinguished Achievement award for Research, 2016 (nominations by TAMU faculty, selected by committee)
Texas A&M chapter of Sigma Xi Outstanding Distinguished Scientist award, 2017 (nominations by TAMU faculty, selected by committee)
Elected Senior Member, National Academy of Inventors, 2019 (nominations by universities, selected by committee)

Other Awards:

National Merit Scholarship Letter of Commendation, 1972
Pomona College Tileston Physics Prize, 1977
NIH Predoctoral Traineeship, 1977- 1982
NIH Postdoctoral Fellowship, 9/l983- 8/l986
American Cancer Society California Chapter Senior Postdoctoral Fellowship, 9/1986-8/1988
Outstanding Associate 1990-91, Hanszen College, Rice University
Exemplary Contributions Award, Premedical Society, Rice University, 1998
Admiral, Texas Navy, 2011 (honorary appointment given with the Inventor of the Year award)
National Academies Education Fellow in the Life Sciences 2013- 2014
Appointed to Thomas Powell '62 Chair in Sciences, TAMU, 2015
Texas A&M System Technology Commercialization Excellence in Innovation award, 2016
Elected faculty member, Phi Kappa Phi, 2017

Current funding:

R01 GM118355 Gomer (PI) 09/23/2016 - 08/31/2020
NIH/ NIGMS 2019 $193,000 direct costs/ year
Elucidation of a eukaryotic chemorepulsion mechanism

The major goals of this project are to elucidate how *Dictyostelium* cells move away from the *Dictyostelium* autocrine secreted chemorepellent AprA. The Aims are to elucidate the AprA receptor and the AprA signal transduction pathway, and to determine if a neutrophil chemorepellent called DPPIV uses the same or a different signal transduction pathway.
Role: Principal Investigator

R21 NS102600 Gomer (PI) 05/01/2017 - 04/30/2020
NIH/ NINDS 2019 $150,000 direct costs/ year

Genetic suppression of loss of TPP1

The major goals of this project are to screen for second-site suppressors of *Dictyostelium* cells with a disruption of the *tpp1* gene. Mutation of *TPP1* (also called *CLN2*) in children causes a subclass of a neurodegenerative syndrome called Batten's disease, and the long-tern goal is to find targets that might suppress some of the effects of *TPP1* mutations.
Role: Principal Investigator

R01 HL132919 Gomer (PI) 02/01/2018 - 01/31/2022
NIH/ NHLBI 2019 $250,000 direct costs/ year
Breaking a novel feedback loop to inhibit fibrosis

The major goals of this project are to determine which sialidases, in which cells, potentiate pulmonary fibrosis, determine how sialidase activity is sensed by cells in the lung to potentiate pulmonary fibrosis, and determine what sensing sialidase activity does to potentiate pulmonary fibrosis.
Role: Principal Investigator

3R01GM118355 Gomer (PI) 09/01/2018 – 08/31/2019
NIH/ NIGMS 2018-9 $82,000 direct costs
Administrative supplement for "Elucidation of a eukaryotic chemorepulsion mechanism"

These funds are for the purchase of a Nikon inverted fluorescence deconvolution microscope with pH measurement capabilities.
Role: Principal Investigator

Most significant accomplishment: Finding a novel mechanism that regulates the innate immune system, and using this to develop therapeutics for fibrosing diseases.
My long-term interest in how cells differentiate led to a breakthrough in the treatment of fibrosing diseases, where scar tissue forms in inappropriate places and interferes with organ function. These diseases, for which there was no effective therapy, kill more people than cancer. We discovered that the human serum protein SAP (also called PTX2, PTX-2, or pentraxin-2) prevents monocytes from differentiating into fibrocytes, which are fibroblast-like cells that participate in scar tissue formation. Realizing that SAP could be used to block scar tissue formation, I co-founded Promedior, a biotechnology company, to develop therapies for fibrotic diseases. Phase 2 clinical trials of SAP have had remarkable success in treating two lethal fibrosing diseases, idiopathic pulmonary fibrosis and myelofibrosis. Our observations of SAP effects on neutrophils, monocytes, and macrophages, showing that SAP essentially calms the innate immune system, has not only reoriented basic research in this area, but is on the verge of changing how a broad range of deadly diseases are treated.

Our current work on fibrosis focuses on second-generation therapeutics, based on our identification of the key SAP receptors (SAP receptor agonists strongly inhibit fibrosis), and our identification of a novel mechanism where an extracellular enzyme called sialidase 3 potentiates fibrosis. In an exciting new direction, we found a new class of sialidase inhibitors that completely attenuate fibrosis in a mouse model, and we are working to take the sialidase inhibitors and the SAP receptor agonists into the clinic.

Other significant work: Fundamental discoveries in *Dictyostelium* signaling and development have led to new paradigms and potential therapeutics.
A key question in developmental biology is how a group of undifferentiated cells can break symmetry and become different cell types. I found that *Dictyostelium* cells use a musical chairs mechanism based on the phase of the cell cycle that a cell happens to be in at the time of starvation to determine initial cell type choice. This fundamental process of reading cell cycle phase to determine cell fate, a mechanism later shown to be used in mammals, changed the narrative in the field of differentiation. In addition, my interest in how cells sense and regulate the size of a group or tissue led to the discovery of a *Dictyostelium* signal that is used to sense and regulate the size of a group using a novel physical mechanism: when the group is too large, the concomitant high levels of the factor decrease cell-cell adhesion and increase cell mobility to cause the group to fragment. In a similar line of investigation, we became interested in the study of chalones, which inhibit the proliferation of cells to regulate tissue size. Starting in the 1930's, a variety of experiments strongly indicated the existence of chalones secreted by specific cell types that inhibit proliferation of the associated cells when the chalone reaches a

sufficiently high concentration in the blood. With the exception of myostatin, a chalone used by muscle cells, the other chalones and their signal transduction pathways have eluded identification, with purification attempts failing. We discovered two different chalones that inhibit *Dictyostelium* cell proliferation, and found that one is based on the unusual molecule polyphosphate. Since the identity of endogenous signals that specifically regulate the size of the liver, or some other tissue, could be useful in a therapeutic setting, we expect that our work on chalones in *Dictyostelium* will teach us, and others, how to successfully revisit the mammalian chalone problem. Lastly, while considerable effort has focused on chemoattractants, much less was known about chemorepellents. We discovered a *Dictyostelium* secreted factor that works as a chemorepellent, and identified a human orthologue that is a neutrophil chemorepellent. The human factor shows therapeutic efficacy by locally repelling neutrophils in mouse models of rheumatoid arthritis and the currently untreatable disease acute respiratory distress syndrome (ARDS). We identified the receptors for both the *Dictyostelium* and human repellents, and found that small molecule agonists of the human receptor repel neutrophils and show efficacy in the mouse ARDS model. We are currently working to elucidate the chemorepulsion mechanism, and, as with SAP, move this into the clinic.

Astronomy: I designed and built detectors and data systems to allow very large telescopes to do new observational modes such as simultaneous very high-speed photometry and spectroscopy. This allowed unprecedented ways to map the movement and distribution of gas in accretion disks, and helped to show, for instance, that the rapidly spinning magnetic field of the white dwarf in the AE Aquarii binary acts like a paddlewheel to spray mass from the donor star out of the system. I stopped the astronomy work when I started working on fibrosis.

Research and professional experience:

1. Electronics Construction, Enrico Fermi Institute, University of Chicago, Summer, 1975
2. Design and construction of a computer-driven large screen display, Biophysics/Theoretical Biology, University of Chicago, Summer, 1976
3. Visiting Scientist, Carnegie Institution of Washington, Mount Wilson and Las Campanas Observatories, 3/1983- 7/1983
4. Postdoctoral Fellow, Biology Department, University of California, San Diego, 9/l983- 9/l988
5. Assistant Professor of Biochemistry and Cell Biology, Rice University, 9/1988- 6/1994; Associate Professor, 7/1994- 6/2000; Professor, 7/2000- 1/2010; Adjunct Professor, 1/2010- present
6. Adjunct Assistant Professor of Cell Biology, Baylor College of Medicine, 4/1990- 8/2005
7. Consultant, Terrapin Diagnostics, 1986- 1999
8. Assistant Investigator, Howard Hughes Medical Institute, 6/1990- 6/1996; Associate Investigator, 7/1996- 8/2000; Investigator, 9/2000- 8/2005
9. Member, NIH Surgery, Radiology, and Bioengineering special study section 8, 4/2001- 8/2003
10. Member, Faculty of 1000, 7/2001- present
11. Science Advisory Board member, Trellis Bioscience, 9/2004- 10/2013
12. Co-organizer (with Richard Sucgang and Adam Kuspa) of the international *Dictyostelium* conference, 2006
13. Co-founder and Science Advisory Board member, Promedior, 5/2006- present
14. Editorial board member, International Journal of Cell Biology, 5/2008- present
15. Editorial board member, Journal of Biomedicine and Biotechnology (name changed to BioMed Research International in 2013), 11/ 2008- 8/2017
16. Court-appointed Technical Advisor for Judge Ron Clark, U.S. Eastern District of Texas for patent cases, 2007- 2009
17. Professor of Biology, Texas A&M University, 1/2010- present
18. Member, Global Fibrosis Foundation Medical Advisory Council, 2/2010- present
19. Editorial board member, Advances in Molecular Imaging, 1/2011- present
20. Member, Faculty of Genetics, Texas A&M University, 5/2011- present
21. Editorial board member, F1000 Research, 5/2012- present
22. Member, NIH Lung Injury, Repair, and Remodeling Study Section, 7/2016- 6/2020
23. Co-organizer of the 2019 international *Dictyostelium* conference

Teaching experience:

Teaching Assistant for first year undergraduate Physics lab section, Pomona College, 1975- 1977
Teaching Assistant for graduate level Electrophysiology course, Caltech, 1977- 1980
Teaching Assistant for undergraduate Cell Biology course, Caltech, 1979- 1982
Biochem 361/501 - General Biochemistry, Rice, 50% of lectures, 1989
Biochem 362/502 - General Biochemistry, Rice, 50% of lectures, 1989
Bios 301 - Biochemistry, 51% of lectures, Rice, 1990- 2001
Biochem 367S - Experimental Biochemistry, Rice, 17% of lectures, 1990
Bios 575 - Introduction to Research in Biochemistry and Cell Biology, Rice, 1 lecture, 1990-2009
Bios 311 - Lab Module in Biochemistry, Rice, 17% of lectures, 1991
Bios 312 - Molecular Biology Lab Module, Rice, 30% of lectures for 2 separate sections, 1992-1995
Bios 313 - Sequencing Lab Module, Rice, 30% of lectures, 1992- 1997
Bios 590 - Special Topics in Biochemistry & Cell Biology, Rice, 50% of lectures, 1995
Bios 590 - Special Topics: Mammalian Morphogenetic Factors, Rice, 50% of lectures, 1997
Bios 318 - Lab Module in Electron Microscopy, Rice, 40% of lectures, 1998, 1 lecture 1999-2002
Bios 588 - Graduate seminar, Rice 16% of lectures, 1998; 50% of lectures, 1999- 2007
Bios 202 - Introductory Biology, Rice, 50% of lectures, 2002- 2006
Bios 488/ 588 - Advanced Cell Biology, Rice, 100% of lectures, 2008- 2009
Bios 594/ Bioengineering 594 - Training in the Responsible Conduct of Research, Rice, 100% of organization, 36% of lectures, 2008; 65% of lectures, 2009
Biol 681-604 - Bioethics, TAMU, 100% of organization, 90% of lectures, 2011- 2012
Biol 213-501, Biol 213-503 - Molecular Cell Biology, TAMU, 50% of lectures (2 sections), 2011-2012
Biol 681-604 - Bioethics, TAMU, 100% of lectures, 2013- present
Biol 213-501 - Molecular Cell Biology, TAMU, 50% of lectures, 2013- present
Biol 489-501 - Ethics in Biological Research, TAMU, 100% of lectures, 2016- present
Biol 689-604 - Biomedical Therapeutics Development, TAMU, 33% of lectures, 2017- present
Biol 489-500 - Introduction to Biomedical Therapeutics Development, TAMU, 33% of lectures, 2018- present

Publications (Richard Gomer's graduate students underlined, postdoctoral students in italics)**:**

Non- refereed publications in Astronomy:

1. Horne, K., and Gomer, R. SS433. IAU Circular No. 3379 (1979).
2. Lanning, H.H., Horne, K., and Gomer, R. Lanning 10. IAU Circular No. 3567 (1981).
3. Martell, P.J., Horne, K., Baptista, R., Gomer, R.H., and Price, C.M. The Oscillating Emission Components in DQ Her. ASP Conference Series **56,** 342-345 (1994).
4. Welsh, W.F., Horne, K., and Gomer, R. Flares and flickering in the cataclysmic variable AE Aquarii. Lecture Notes in Physics **454,** 278-279 (1995).
5. Skidmore, W., Pearson, K.J., O'Brien, K., Horne, K., and Gomer, R. Fireballs and oscillations in AE Aqr., The Physics of Cataclysmic Variables and Related Objects: ASP Conference Series **261**, 169-170 (2002).
6. Skidmore, W., Gomer, R.H, Horne, K., O'Brien, K., Oke, B. and Pearson, K.J. High Speed Keck Spectroscopy of Flickering in AM Her. IAU Colloquium 190 on Magnetic Cataclysmic Variables: ASP Conference Series **315**, 163-169 (2004).

Refereed publications in Astronomy:

1. Horne, K., and Gomer, R. Phase variability in the rapid oscillation of SS Cygni. Astrophysical Journal **237,** 845-849 (1980).
2. Petro, L.D., Bradt, H.V., Kelley, R.L., Horne, K., and Gomer, R. Rapid X-ray and optical flares from Scorpius X-1. Astrophysical Journal **251**, L7-L11 (1981).
3. Horne, K., Lanning, H.H., and Gomer, R. A first look at the cataclysmic variable Lanning 10. Astrophysical Journal **252**, 681-689 (1982).

4. Jensen, K.A., Cordova, F.A., Middleditch, J., Mason, K.O., Grauer, A.D., Horne, K., and Gomer, R. The correlated X-ray and optical time variability of TT Arietis. Astrophysical Journal **270**, 211-225 (1983).
5. Welsh, W.F., Horne, K., and Gomer, R. On the location of the oscillations in AE Aquarii. Astrophysical Journal **410**, L39-L42 (1993).
6. Martell, P.J., Horne, K., Price, C.M., and Gomer, R.H. Taking the pulse of DQ Herculis. Astrophysical Journal **448**, 380-394 (1995).
7. Welsh, W.F., Horne, K., and Gomer, R. A study of the absorption lines from the donor star in the exotic cataclysmic variable AE Aquarii. Monthly Notices of the Royal Astronomical Society **275**, 649-670 (1995).
8. Welsh, W.F., Horne, K., and Gomer, R.H. Doppler signatures of Hα flares in AE Aquarii. Monthly Notices of the Royal Astronomical Society **298**, 285-302 (1998).
9. Bloom, J.S., Frail, D.A., Kulkarni, S.R., Djorgovski, S.G., Halpern, J.P., Marzke, R.O., Patton, D.R., Oke, J.B., Horne, K.D., Gomer, R., Goodrich, R., Campbell, R., Moriarty-Schieven, F.H., Redman, R.O., Feldman, P.A., Costa, E., Masetti, N. The discovery and broad-band follow-up of the transient afterglow of GRB 980703. Astrophysical Journal **508**, L21-L24 (1998).
10. Steeghs, D., O'Brien, K., Horne, K., Gomer, R., and Oke, B. Emission line oscillations in the dwarf nova V2051 Ophiuchi. Monthly Notices of the Royal Astronomical Society **323**, 484-496 (2001).
11. O'Brien, K., Horne, K., Boroson, B., Still, M., Gomer, R., Oke, J.B., Boyd, P., and Vrtilek, S.D. Keck II spectroscopy of mHz quasi-periodic oscillations in Hercules X-1. Monthly Notices of the Royal Astronomical Society **326,** 1067-1075 (2001).
12. Skidmore, W., O'Brien, K., Horne, K., Gomer, R.H., Oke, J.B., and Pearson, K.J. High speed Keck spectroscopy of flares and oscillations in AE Aquarii. Monthly Notices of the Royal Astronomical Society **338**, 1057-1066 (2003).
13. O'Brien, K., Horne, K, Gomer, R.H., Oke, J.B., and van der Klis, M. High-speed Keck II and RXTE spectroscopy of Cygnus X-2: (I) Three X-ray components revealed by spectral variability. Monthly Notices of the Royal Astronomical Society **350**, 587-595 (2003).

Non- refereed publications in Biology:

1. Gomer, R.H., Datta, S., Mehdy, M., Crowley, T., Sivertson, A., Nellen, W., Reymond, C., Mann, S., and Firtel, R.A. Regulation of cell-type specific gene expression in *Dictyostelium*. Cold Spring Harbor Symp. Quant. Biol. **50,** 801-812 (1985).
2. Reymond, C.D., Nellen, W., Gomer, R.H., and Firtel, R.A. Regulation of the *Dictyostelium ras* gene during development and in transformants. In *Progress in Developmental Biology, Part A* (H.C. Slavkin, Ed.), Alan R. Liss, New York, pp. 17-21 (1986).
3. Gomer, R.H., and Firtel, R.A. Tissue morphogenesis in *Dictyostelium discoideum*. In *Molecular Approaches to Developmental Biology* (R.A. Firtel and E.H. Davidson, Eds.). Alan R. Liss, New York. pp. 373-383 (1987).
4. Datta, S., Mann, S.K.O., Hjorth, A., Gomer, R.H., Howard, P., Armstrong, D., Reymond, C., Silan, C., and Firtel, R.A. cAMP-regulated gene expression during *Dictyostelium* development is mediated by the cell-surface cAMP receptor. In *Genetic Regulation of Development, 45th Symposium for the Society of Developmental Biology* (W.F. Loomis, Ed.). Alan R. Liss, New York. pp. 33-61 (1987).
5. Gomer, R.H. A strategy to study development and pattern formation: Use of antibodies against products of cloned genes. In *Methods in Cell Biology* (J.A. Spudich, Ed.). Academic Press, New York, pp. 471-487 (1987).
6. Gomer, R. Knowing that you're among friends. Current Biology **4**, 734-735 (1994).
7. Clarke, M. and Gomer, R.H. PSF and CMF, autocrine factors that regulate gene expression during growth and early development of *Dictyostelium*. Experientia **51**, 1124-1134 (1995).
8. Gomer, R.H. Cell-density sensing: Come on inside and tell us about it. Current Biology **7**, R721-R722 (1997).

9. Jain, R., *Brazill, D.T.*, Cardelli, J.T., Bush, J., and Gomer, R.H. Autocrine factors controlling early development. In *Dictyostelium-A Model System for Cell and Developmental Biology*. (Y. Maeda, K. Inouye, and I. Takeuchi, Eds.) Universal Academy Press, Inc., Tokyo, Japan. pp. 219-234 (1997).
10. *Spann, T.P.*, Brock, D.A., and Gomer, R.H. Shotgun antisense mutagenesis. In *Antisense Technologies: A Practical Approach*. (Lichtenstein, C. and Nellen, W. Eds.) Oxford University Press, Oxford, UK. pp. 273-279 (1997).
11. Gomer, R.H. Cell Density Sensing in a Eukaryote. ASM News **65,** 23-29 (1999).
12. Gomer, R.H., *Gao, T.*, Tang, Y., Knecht, D., and Titus, M.A. Cell motility mediates tissue size regulation in *Dictyostelium*. J. Muscle Res. Cell Motil. **23**, 809-815 (2002).
13. Gomer, R.H. and Brazill, D. The versatile *Dictyostelium discoideum*. Meeting Report: International *Dictyostelium* Conference 2002. Protist **154**, 5-10 (2003).
14. *Roisin-Bouffay, C.*, and Gomer, R.H. Comment atteindre la bonne taille. Médecine/Sciences **20**, 219-224 (2004).
15. de Paula, R.M., Vitalini, M.W., Gomer, R.H., and Bell-Pedersen, D. Complexity of the *Neurospora crassa* Circadian Clock System: Multiple Loops and Oscillators. Cold Spring Harbor Symposia on Quantitative Biology **72**, 345-351 (2007).
16. *Brazill, D.* and Gomer, R.H. A eukaryotic neighbor: *Dictyostelium discoideum*. In *Myxobacteria: Multicellularity and Differentiation* (D.E. Whitworth, Ed). ASM Press, Washington, DC. pp 439-452 (2008).
17. Gomer, R.H. and Lupher, M.L. Investigational approaches to therapies for idiopathic pulmonary fibrosis. Expert Opinion on Investigational Drugs **19,** 737-745 (2010).
18. Gomer, R.H. New approaches to modulating idiopathic pulmonary fibrosis. Current Allergy and Asthma Reports **13,** 607-612 (2013).
19. Phillips, J.E. and Gomer, R.H. A canine model for Neuronal Ceroid Lipofuscinosis highlights the promise of gene therapy for lysosomal storage diseases. Annals of Translational Medicine **4,** S20 (2016).

Refereed publications in Biology:

1. Gomer, R.H., and Lazarides, E. The synthesis and deployment of filamin in chicken skeletal muscle. Cell **23**, 524-532 (1981).
2. Wang, C., Gomer, R.H., and Lazarides, E. Heat shock proteins are methylated in avian and mammalian cells. Proc. Natl. Acad. Sci. USA **78,** 3531-3535 (1981).
3. Gomer, R.H., and Lazarides, E. Switching of filamin polypeptides during myogenesis *in vitro*. J. Cell Biol. **96**, 321-329 (1983).
4. Gomer, R.H., and Lazarides, E. Highly homologous filamin polypeptides have different distributions in slow and fast muscle fibers. J. Cell Biol. **97,** 818-823 (1983).
5. Reymond, C.D., Gomer, R.H., Mehdy, M.C., and Firtel, R.A. Developmental regulation of a *Dictyostelium* gene encoding a protein homologous to mammalian *ras* protein. Cell **39**, 141-148 (1984).
6. Gomer, R.H., Datta, S., and Firtel, R.A. Sequencing homopolymer regions. Focus **7,** 6-7 (1985).
7. Crowley, T.E., Nellen, W., Gomer, R.H., and Firtel, R.A. Phenocopy of discoidin I- minus mutants by anti-sense transformation in *Dictyostelium*. Cell **43**, 633-641 (1985).
8. Datta, S., Gomer, R.H., and Firtel, R.A. Spatial and temporal regulation of a foreign gene by a prestalk specific promoter in transformed *Dictyostelium discoideum*. Mol. Cell. Biol. **6,** 811-820 (1986).
9. Gomer, R.H., Armstrong, D., Leichtling, B.H., and Firtel, R.A. cAMP induction of prespore and prestalk gene expression in *Dictyostelium* is mediated by the cell-surface cAMP receptor. Proc. Natl. Acad. Sci. USA **83**, 8624-8628 (1986).
10. Reymond, C.D., Gomer, R.H., Nellen, W., Theibert, A., Devreotes, P., and Firtel, R.A. Phenotypic changes induced by a mutated *ras* gene during the development of *Dictyostelium* transformants. Nature **323**, 340-343 (1986).
11. Gomer, R.H., Datta, S., and Firtel, R.A. Cellular and subcellular distribution of a cAMP-regulated prestalk protein and prespore protein in *Dictyostelium discoideum:* A study on the ontogeny of prestalk and prespore cells. J. Cell Biol. **103**, 1999-2015 (1986).

12. Gomer, R.H., and Firtel, R.A. Cell-autonomous determination of cell-type choice in *Dictyostelium* development by cell-cycle phase. Science **237,** 758-762 (1987).
13. Price, M.G. and Gomer, R.H. Mitoskelin: A mitochondrial protein found in cytoskeleton preparations. Cell Motility and the Cytoskeleton **13**, 274-287 (1989).
14. Kauvar, L.M., Cheung, P.Y.K., Gomer, R.H., and Fleischer, A.A. Paralog chromatography. Biotechniques **8,** 204-209 (1990).
15. Kauvar, L.M., Cheung, P.Y.K., Gomer, R.H., and Fleischer, A.A. Paralog chromatography. BioChromatography **5**, 22-26 (1990). (Explanation: James Ellingboe, the editor of both BioTechniques and BioChromatography, after acceptance of 14, requested that he be able to reprint it as 15.)
16. Gomer, R.H., Yuen, I.S., and Firtel, R.A. A secreted $80x10^3$ M_r protein mediates sensing of cell density and the onset of development in *Dictyostelium*. Development **112**, 269-278 (1991).
17. Yuen, I.S., Taphouse, C., Halfant, K., and Gomer, R.H. Regulation and processing of a secreted protein that mediates sensing of cell density in *Dictyostelium*. Development **113**, 1375-1385 (1991).
18. Jain, R., Murtagh, J.J.Jr., Gomer, R.H. Increasing specificity and yield from the PCR-RACE technique. BioTechniques **12**, 58-59 (1992).
19. Jain, R., Yuen, I.S., Taphouse, C.R., and Gomer, R.H. A density sensing factor controls development in *Dictyostelium*. Genes & Development **6**, 390-400 (1992).
20. Clarke, M., Dominguez, N., Yuen, I.S., and Gomer, R.H. Growing and starving *Dictyostelium* cells produce distinct density-sensing factors. Developmental Biology **152**, 403-406 (1992).
21. Schatzle, J., Bush, J., Dharmawardhane, S., Firtel, R.A., Gomer, R.H., and Cardelli, J. Characterization of the signal transduction pathways and cis-acting DNA sequence responsible for the transcriptional induction during growth and development of the lysosomal α-mannosidase gene in *Dictyostelium discoideum*. J. Biological Chemistry **268**, 19632-19639 (1993).
22. Price, M.G., and Gomer, R.H. Skelemin, a cytoskeletal M-disc periphery protein, contains motifs of adhesion/recognition and intermediate filament proteins. J. Biological Chemistry **268**, 21800-21810 (1993).
23. Price, M.G., Caprette, D.R., and Gomer, R.H. Different temporal patterns of expression result in the same type, amount and distribution of filamin (ABP) in cardiac and skeletal myofibrils. Cell Motil. Cytoskel. **27**, 248-261 (1994).
24. Jain, R., and Gomer, R.H. A developmentally regulated cell surface receptor for a density-sensing factor in *Dictyostelium*. J. Biological Chemistry **269,** 9128-9136 (1994).
25. Yuen, I.S., and Gomer, R.H. Cell density-sensing in *Dictyostelium* by means of the accumulation rate, diffusion coefficient and activity threshold of a protein secreted by starved cells. J. Theoretical Biology **167**, 273-282 (1994).
26. Yuen, I.S., Jain, R., Bishop, J.D., *Lindsey, D.F.*, Deery, W.J., Van Haastert, P.J.M., and Gomer, R.H. A density-sensing factor regulates signal transduction in *Dictyostelium*. J. Cell Biol. **129**, 1251-1262 (1995).
27. Clay, J., Ammann, R., and Gomer, R.H. Initial cell-type choice in a simple eukaryote: Cell-autonomous or morphogen-gradient dependent? Developmental Biology **172,** 665-674 (1995).
28. Gomer, R.H. and Ammann, R. A cell-cycle phase-associated cell-type choice mechanism monitors the cell cycle rather than using an independent timer. Developmental Biology **174**, 82-91 (1996).
29. *Spann, T.P.*, Brock, D.A., *Lindsey, D.F.*, *Wood, S.A.*, and Gomer, R.H. Mutagenesis and gene identification in *Dictyostelium* by shotgun antisense. Proc. Natl. Acad. Sci. USA **93**, 5003-5007 (1996).
30. Brock, D.A., Buczynski, F., *Spann, T.P.*, *Wood, S.A.*, Cardelli, J., and Gomer, R.H. A *Dictyostelium* mutant with defective aggregate size determination. Development **122**, 2569-2578 (1996).
31. Van Haastert, P.J.M., Bishop, J.D., and Gomer, R.H. The cell density factor CMF regulates the chemoattractant receptor cAR1 in *Dictyostelium*. J. Cell Biol. **134**, 1543-1549 (1996).
32. *Wood, S.A.*, Ammann, R.R., Brock, D.A., Li, L., *Spann, T.P.*, Gomer, R.H. RtoA links initial cell type choice to the cell cycle in *Dictyostelium*. Development **122**, 3677-3685 (1996).

33. *Brazill, D.T.*, Gundersen, R. and Gomer, R.H. A cell-density sensing factor regulates the lifetime of a chemoattractant-induced Gα-GTP conformation. FEBS Letters **404**, 100-104 (1997).
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Manuscripts submitted for publication:
1. Castellanos, A., Gomer, R.H., and Fernandez-Lima, F. Submicron 3-D mass spectrometry imaging reveals an asymmetric molecular distribution on chemotaxing cells. Submitted.
2. Karhadkar, T.R. and Gomer, R.H. Attenuated pulmonary fibrosis in sialidase-3 knockout (*Neu3*$^{-/-}$) mice. Submitted.
3. Roife, D., Fleming, J.B., and Gomer, R.H. Fibrocytes in the Tumor Microenvironment. Submitted.
4. *Chen, W.*, Lamb, T.R., and Gomer, R.H. TGF-β1 Increases Sialidase 3 Expression in Human Lung Epithelial Cells by Decreasing its Degradation and Upregulating its Translation. Submitted.

Issued Patents:
1. Gomer, R. H. and Pilling, D. Methods of detecting the inhibition of fibrocyte formation and methods and compositions for enhancing fibrocyte formation. European patent **1576368** (2009).
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