

Prof. Ravi V. Bellamkonda
Ravi Bellamkonda

Georgia Cancer Coalition Distinguished Scholar
Deputy Director of Research, GTEC (an NSF funded ERC)
Professor of Biomedical Engineering
Neurological Biomaterials & Therapeutics
WHC Department of Biomedical Engineering
Georgia Tech/Emory University
3108 UA Whitaker Bldg
313 Ferst Drive NE
Atlanta, Georgia 30332-0535

Phone: 404.385.5038 (Office), 404.385.5033 (Lab)
Fax: 404.385.5044
Email: ravi@bme.gatech.edu

WORK EXPERIENCE

July 05 - Present: Professor with tenure, Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech/Emory, Atlanta, GA

June 03 - Present: Thrust Leader for Neural Tissue Engineering, NSF ERC "Georgia Tech/Emory Center for Engineering Living Tissues"

June 03 - June 05: Associate Professor, Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech/Emory, Atlanta, GA

September 01 - June 03: Associate Professor with tenure, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH

August 95 - August 01: Assistant Professor of Biomedical Engineering, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, Ohio.

August 94 - August 95: Markey Post-Doctoral Fellow, Dept. of Brain and Cognitive Sciences, Massachusetts Institute of Technology, Cambridge, Massachusetts.

EDUCATION

July 94 Ph.D. (Medical Sciences), Section of Artificial Organs, Biomaterials and Cellular Technology, Brown University, Providence Rhode Island.

January 93 - July 94 On leave from Brown University as a "traveling scholar" to finish doctoral work with Dr. P. Aebischer at the University of Lausanne Medical School, Switzerland.

May 89 Bachelor of Engineering (Biomedical), College of Engineering, Osmania University, India.

AWARDS AND HONORS

- * Secretarial Appointee, VA Rehabilitation Merit Review Board, 2007 - present
- * Georgia Cancer Coalition Distinguished Scientist Award, 2007 - present
- * Recipient of the 2005 Global Indus Technovators Awards
- * Elected, AIMBE College of Fellows
- * Associate Editor, IEEE Transactions on Neural Systems and Rehabilitation Engineering Journal
- * Editorial Board Member, Experimental Biology and Medicine, 2006 - present
- * "Best Professor" Award conferred by the undergraduate student body of the Wallace H. Coulter Department of Biomedical Engineering, Georgia Institute of Technology/Emory University. May 2005.
- * Neural Engineering Track Co-Chair, BMES 2005, Baltimore, MD.
- * Elected Fellow, Institute of Physics, September 2004 - present
- * Programmatic Thrust Leader, Neural Tissue Engineering, at GTEC an NSF Engineering Research Center at Georgia Tech/Emory, June 2003 - present
- * Editorial Board Member, Journal of Neural Engineering, September 2003 - present.
- * Bruce Jackson Award Nominee for Distinguished Mentorship of Students at the Undergraduate level, CWRU, April 2003.
- * Steering Committee Member, Tissue Engineering Society International's North American Chapter, December 2002 - present.
- * Discussion Leader, Gordon Conference on Tissue Eng. & Biocompatibility: Holderness Academy, NY, July 01.
- * Chair, Tissue Engineering Special Interest Group, Society for Biomaterials, 2000-2002.
- * Invited Symposium Chair and Organizer, Engineering Nerve Regeneration, BMES-EMBS 99, Atlanta, GA.
- * Ad-hoc Member, NIH MDCN-3 Study section. Member, Review Panel, MRI Program, Engineering Directorate, National Science Foundation, May 1998.
- * Co-Chair, Tissue Engineering Track, Biomedical Engineering Society Meeting, October 1998.
- * Ad-hoc reviewer for Neuroscience, Journal of Neuroscience Research, Journal of Biological Chemistry, Journal of Biomedical Materials Research, Journal of Biomaterials Science, Polymer Edition, Trends in Biotechnology, Journal of Cellular Engineering, Artificial Organs, Tissue Engineering, Journal of Controlled Release, Journal of Nanoscience and Nanotechnology.

PROFESSIONAL AFFILIATIONS

- * Society for Neuroscience
- * Society for Biomaterials
- * Biomedical Engineering Society

PUBLICATIONS

1. Fine E.G., Valentini, R.F., Bellamkonda, R. and Aebischer, P. 1991. Improved nerve regeneration through piezoelectric vinylidene fluoride-trifluoroethylene copolymer guidance channels." *Biomaterials* 12: 775-780.
2. Ranieri, J.P., Bellamkonda, R., Jacob, J., Vargo, T., Gardella J.A. and Aebischer, P. 1993. Selective neuronal cell attachment to a covalently patterned monoamine on fluorinated ethylene propylene films." *Journal of Biomedical Materials Research* 27: 917-925.
3. Bellamkonda, R. and Aebischer, P. 1994. Review: Tissue engineering in the nervous system. *Biotechnology and Bioengineering* 43: 543-554.
4. Ranieri, J.P., Bellamkonda, R., Bekos, E.J., Gardella Jr, J.A. and Aebischer, P. 1994. Spatial control of neural cell attachment and differentiation on covalently patterned laminin oligopeptide substrates." *International Journal of Developmental Neuroscience*. 12: 725-735.
5. Taborelli, M., Ranieri, J.P., Bellamkonda, R., Eng, L., Aebischer, P. and Descouts, P. 1995. Adsorption of albumin on methyl and amine substituted surfaces investigated by scanning force microscopy." *Journal of Biomedical Materials Research*. 29: 707-714.
6. Ranieri, J.P., Bellamkonda, R., Bekos, E.J., Gardella Jr, J.A. and Aebischer, P. 1995. Neuronal cell attachment to fluorinated ethylene propylene films with covalently immobilized laminin oligopeptides." *Journal of Biomedical Materials Research*. 29: 779-785.
7. Vargo, T.G., Bekos, E.J., Kim-Jo, Y.S., Ranieri, J.P., Bellamkonda, R., Aebischer, P., Margevich, D.E., Thompson, P.M., Bright, F.V. and Gardella Jr, J.A. 1995. Synthesis and characterization of fluoropolymeric substrata with lithographically patterned minimal peptide sequences for cell adhesion and growth studies." *Journal of Biomedical Materials Research*. 29: 767-778.
8. Bellamkonda, R., Ranieri, J.P. and Aebischer, P. 1995. Laminin oligopeptide derivatized agarose gels allow three dimensional neurite extension in vitro." *Journal of Neuroscience Research*. 41: 501-509.
9. Bellamkonda, R., Ranieri, J.P., Bouche, N. and Aebischer, P. 1995. A hydrogel based three dimensional matrix for neural cells. *Journal of Biomedical Materials Research*. 29: 663-671.
10. Bellamkonda, R.V., Kader, K., Akella, R., and Ranieri, J.P. 1997. Gene therapy approaches in the cardiovascular system. *Journal of Cellular Engineering*, 2: 66-74.
11. Yu X, Dillon GP, and Bellamkonda RV. 1999. A laminin and nerve growth factor laden three-dimensional scaffold for enhanced neurite extension. *Tissue Engineering* 5:291-304.
12. Dillon GP, Yu X, Ranieri JP, and Bellamkonda RV. 1999. The influence of physical structure and charge polarity on neurite extension in 3D hydrogel scaffolds. *Journal of Biomaterials Science, Polymer Ed.* 9: 1015-1114.
13. Bellamkonda RV. 1999. Neural Tissue Engineering. *Science and Medicine* 6: 6-7.

14. Eavarone D, Yu X, and Bellamkonda RV. 2000. Targeted Drug Delivery to C6 Glioma by Transferrin-Coupled Liposomes. *Journal of Biomedical Materials Research* 51(1):10-14.
15. Kader K, Ziats NP, Harasaki H, Akella R, Ranieri JP and Bellamkonda RV. 2000. eNOS transfected endothelial cells inhibit platelet aggregation and smooth muscle cell proliferation in vitro. *Tissue Engineering* 6(3): 241-251.
16. Dillon GP, Yu X, Bellamkonda RV. 2000. The polarity and magnitude of ambient charge influences three-dimensional neurite extension from DRGs. *Journal of Biomedical Materials Research* 51: 510-519.
17. Kader KN, Moore LR, Saul JM, Zborowski M, Ziats NP and Bellamkonda RV. 2001. Isolation and Purification of Canine Adipose Microvascular Endothelial Cells for Synthetic Vascular Graft Seeding. *Journal of Microvascular Surgery* 61: 220-226.
18. Balgude AP, Yu X, Szymanski A, Bellamkonda RV. 2001. Agarose gel stiffness determines rate of DRG neurite extension in 3D cultures. *Biomaterials* 22: 1077-1084.
19. Meilander N, Yu X, Ziats NP and Bellamkonda RV. 2001. Lipid-based microtubular drug delivery vehicles. *Journal of Controlled Release* 71(1): 143-154.
20. Yu, X. and Bellamkonda, R.V. 2001. Dorsal root ganglia neurite extension is inhibited by mechanical and chondroitin sulfate-rich interfaces. *Journal of Neuroscience Research*. 66(2): 303-310.
21. Zhong Y, Yu X., Gilbert R, and Bellamkonda RV. 2001. Stabilizing electrode-host interfaces: a tissue engineering approach. *Journal of Rehabilitation Research and Development*. 38(6): 627-632.
22. Kader KN, Sweaney J, and Bellamkonda RV. 2002. Cationic lipid mediated transfection of bovine aortic endothelial cells inhibits their attachment. *Journal of Biomedical Materials Research* 60: 405-410.
23. Kao Chen-Yu, Hoffman E, Beck K, Bellamkonda, RV and Annapragada A. 2003. Long residence time nano-scale liposomal Iohexol® for X-ray based blood pool imaging. *Academic Radiology* 10: 475-483.
24. Yu X and Bellamkonda RV. 2003. Tissue Engineered scaffolds are effective alternatives to autografts in bridging peripheral nerve gaps in rodents. *Tissue Engineering* 9: 421-430.
25. Meilander, N. J., Pasumarthy, M. K., Kowalczyk, T. H., Cooper, M. J. & Bellamkonda, R. V. 2003. Sustained release of plasmid DNA using lipid microtubules and agarose hydrogel. *Journal of Controlled Release* 88, 321-331.
26. Saul JM, Natarajan JV, Annapragada A, Bellamkonda RV. 2003. Controlled targeting of liposomal doxorubicin via the folate receptor in vitro. *Journal of Controlled Release* 92: 49-67.
27. Jain A, Brady-Kalnay S, Bellamkonda RV. 2004. Modulation of Rho GTPase Activity Alleviates Chondroitin Sulfate Proteoglycan-dependent Inhibition. *Journal of Neuroscience Research* 77(2):299-307.
28. He W and Bellamkonda RV. 2005. Nanoscale neuro-integrative coatings for neural implants. *Biomaterials* 26(16): 2983-2990.
29. Meilander-Lin NJ, Cheung P, Wilson D, and Bellamkonda RV. 2005. Sustained in vivo gene delivery from agarose hydrogels prolongs gene expression in the skin. *Tissue Engineering* 11(3-4): 546-555.

30. Karathanasis E, Ayyagari AL, Bhavane R, Bellamkonda RV, and Annapragada AV. 2005. Preparation of in vivo cleavable agglomerated liposomes suitable for modulated pulmonary drug delivery. *Journal of Controlled Release* 103(1): 159-175.
31. Ghagada K, Saul J, Bellamkonda RV and Annapragada A. 2005. Folate targeting of drug carriers: A mathematical model. *Journal of Controlled Release* 104(1):113-28.
32. Zhong Y, McConnell G, Ross J, DeWeerth S, and Bellamkonda RV. A Novel Dexamethasone-releasing, Anti-inflammatory Coating for Neural Implants. Proceedings of the 2nd International IEEE EMBS Conference on Neural Engineering, Arlington, VA, 2005, 522-525.
33. Zhong Y, Bellamkonda RV. 2005. Controlled Release of anti-inflammatory agent alpha-MSH from Neural Implants. *Journal of Controlled Release* 106(3):309-18.
34. Gilbert RJ, McKeon RJ, Darr A, Calabro A, Hascall VC and Bellamkonda RV. 2005. CS 4,6 is differentially upregulated in glial scar and is a potent inhibitor of neurite extension. *Molecular and Cellular Neuroscience* 29(4):545-58.
35. Mukundan S Jr, Ghaghada KB, Badea CT, Kao CY, Hedlund LW, Provenzale JM, Johnson GA, Chen E, Bellamkonda RV, Annapragada A. 2006. A Liposomal Nanoscale Contrast Agent for Preclinical CT in Mice. *American Journal of Roentgenology* 186(2):300-7.
36. Lee HJ, Bellamkonda RV, Sun W, and Levenston ME. 2005. Biomechanical analysis of silicon microelectrode induced strain in the brain. *Journal of Neural Engineering* 2(4):81-9.
37. Jain A, Kim Y-T, McKeon RJ and Bellamkonda RV. 2006. In situ gelling hydrogels for conformal repair of spinal cord defects and local delivery of BDNF after spinal cord injury. *Biomaterials* 27(3):497-504.
38. Patz TM, Doraiswamy A, Narayan RJ, He W, Zhong Y, Bellamkonda RV, Modi R, Chrisey DB. 2006. Three-dimensional direct writing of B35 neuronal cells. *Journal of Biomedical Materials Research Part B: Applied Biomaterials* 78(1):124-30.
39. Bellamkonda RV. 2006. Peripheral Nerve Regeneration: An Opinion on Channels, Scaffolds and Anisotropy. *Biomaterials* 27(19):3515-8.
40. Ayyagari AL, Zhang X, Ghaghada KB, Annapragada A, Hu X, and Bellamkonda RV. 2006. Long-Circulating Liposomal Contrast Agents for Magnetic Resonance Imaging. *Magnetic Resonance in Medicine* 55(5)1023-9.
41. Dodla M and Bellamkonda RV. 2006. Anisotropic scaffolds facilitate enhanced neurite extension in vitro. *Journal of Biomedical Materials Research*. 78(2):213-21.
42. Saul JM, Annapragada AV, Bellamkonda RV. 2006. A Dual Ligand Approach for Enhancing Targeting Selectivity of Therapeutic Nanocarriers. *Journal of Controlled Release* 114(3):277-287.
43. Crompton KE, Forsythe JS. 2006. Polylysine-functionalised thermoresponsive chitosan hydrogel for neural tissue engineering. *Biomaterials* 28(3):441-49.
44. He W, McConnell G, and Bellamkonda RV. 2006. Nanoscale laminin coating modulates cortical scarring response around implanted silicon microelectrode arrays. *Journal of Neural Engineering*, 3:316-326.

45. McConnell G, Schneider TM, Owens DJ, and Bellamkonda RV. 2007. Extraction Force and Cortical Tissue Reaction of Silicon Microelectrode Arrays Implanted in the Rat Brain. *IEEE Transactions on Biomedical Engineering* 54(6 Pt 1):1097-107.
46. Zhong Y and Bellamkonda RV. 2007. Dexamethasone Coated Neural Probes Elicit Attenuated Inflammatory Response and Neuronal Loss Compared to Uncoated Neural Probes. *Brain Research* 1148:15-27.
47. He W, McConnell G, Schneider T, and Bellamkonda RV. A Novel Anti-inflammatory Surface for Neural Electrodes. *Advanced Materials* 19(21): 3529.
48. McNeeley K, Annapragada A, and Bellamkonda RV. 2007 Decreased circulation time offsets increased efficacy of PEGylated nanocarriers targeting folate receptors of glioma. *Nanotechnology* 18:385101.
49. Dodla M and Bellamkonda RV. 2007. Differences Between the Effects of Anisotropic and Isotropic Laminin and Nerve Growth Factor Presenting Scaffolds on Nerve Regeneration Across Long Peripheral Nerve Gaps in Rodents. *Biomaterials*, 29: 33-46.
50. Karathanasis E, McNeeley K, Agarwal A, Annapragada AV, and Bellamkonda RV. 2007. MR trackable, chemotherapeutic nanoparticles for patient specific glioma therapy. *Microscopy and Microanalysis* 13(Suppl 2): 44-45.
51. Agarwal A, Giegerman CM, Jaye DL, Bellamkonda RV. 2007. Rational identification of a novel peptide for targeting nanocarriers to 9L glioma. In Press, *Journal of Biomedical Materials Research*.
52. Chvatal S, Kim Y-T, Bratt-Leal A, Lee H-J, and Bellamkonda RV. 2008. Spatial distribution and acute anti-inflammatory effects of Methylprednisolone after sustained local delivery to the contused spinal cord. *Biomaterials* 29:1967.
53. Kim Y-T, Haftel VK, Kumar S, Bellamkonda RV. 2008. The role of aligned polymer fiber-based constructs in the bridging of long peripheral nerve gaps. *Biomaterials* 29:3117.
54. Bellamkonda RV. 2008. Biomimetic Materials: Marine Inspiration. In Press, *Nature Materials*.
55. Zhong Y and Bellamkonda RV. 2008. Biomaterials for the central nervous system. In Press, *Journal of the Royal Society Interface*.
56. Karathanasis E, Park J, Agarwal A, Patel V, Zhao F, Annapragada A, Hu X, and Bellamkonda RV. 2008. MRI mediated, non-invasive tracking of intratumoral distribution of nanocarriers in rat glioma. In Press, *Nanotechnology*.

COURSES

BMED 1300: Problems-Biomedical Engineering I

Credits: 3.00

Biomedical engineering problems from industrial and clinical applications are addressed and solved in small groups using problem-based learning methodologies.

Lecture: 1.00 Lab: 6.00

Pre-requisites: MATH 1501 and BIOL 1510

BMED 2300: Problems-Biomedical Engineering II: Engineering Design

Credits: 3.00

Biomedical engineering problems from industrial and clinical applications are addressed and solved in small groups using problem-based learning methods.
Lecture: 1.00 Lab: 6.00

BMED 4500 - Cell and Tissue Engineering Laboratory

Credits: 3.00

The principles of cell and tissue engineering will be presented as a laboratory course to give students a hands-on experience. Cell engineering topics include receptor/ligand interactions, cell cycle/metabolism, cell adhesion, cellular mechanics, cell signal transduction, and cell transfection. Tissue engineering topics include applications, biomaterials/scaffolds and cells for reparative medicine, bioreactors and bioprocessing, functional assessment, in vivo issues.

Lecture: 1.00 Lab: 6.00

BMED 4823: Special Topics

Credits: 3.00

Courses in special topics of current interest not included in the regular course offerings.

Lecture: 3.00