Molnár Péter

# Docens

## Személyi adatok

- Családi állapot: Elvált
- Születési dátum: 1965. Július 1.
- Születési hely: Szombathely

## Iskolák

[1984-1989] Okleveles Fizikus/Biofizikus
Eötvös Loránd Tudományegyetem, Budapest

[1989-1992] University Doctor (Biofizika)
Eötvös Loránd Tudományegyetem, Budapest

[2009 - 2010] Ph.D. (Neurobiológia)
Pécsi Tudományegyetem, Pécs

## Munkahelyek

[ 2010-] Docens

Nyugat-magyarországi Egyetem, Természettudományi Kar,
Savaria Egyetemi Központ, Állattani Tanszék, Szombathely

Állatélettan, Biofizika, Biometria, Toxikológia tantárgyak tanítása

In vitro elektrofiziológiai / toxikológiai labor létrehozása

*Molekuláris biológiai / sejttenyésztő labor* elindítása

[ 2012-] Adjunkt Assistant Professor

Cornell University,Ithaca, New York
Collaboration on Tissue Engineering Projects.

[ 2008-10] Adjunktus

Nyugat-magyarországi Egyetem, Természettudományi Kar,
Savaria Egyetemi Központ, Állattani Tanszék, Szombathely

Állatélettan, Biofizika, Biometria, Toxikológia tantárgyak tanítása

In vitro elektrofiziológiai / toxikológiai labor létrehozása

*Molekuláris biológiai / sejttenyésztő labor* munkájának megszervezése

[ 2010] Senior Biologist
University of Central Florida, Medical Center, Orlando, FL

Külső forrásból finanszirozott kutatás vezetése/végzése

[2004-2009] Assistant Professor
University of Central Florida, Nanoscience Technology
Center and Biomolecular Science Center, Orlando, FL

Külső forrásból finanszirozott saját laboratórium megteremtése

Szövetépités és idegtudomány tantárgyak tanitása

[ 2003-2004] Research Assistant Professor
Clemson University, Dept. Bioengineering, Clemson, SC
Három saját grant pályázása és elnyerése
Bioinstrumentáció tantárgy tanitása

[ 2000-2003] Postdoctoral Fellow
Clemson University, Dept. Bioengineering, Clemson, SC
Élő sejten alapuló bioszenzorok fejlesztése, multi-elektródás mérések
Mesterséges neuronális hálózatok tervezése és fejlesztése
Felület-sejt kölcsönhatások kutatása
Idegsejtek és ion csatornák modellezése

[1996-2000] Research Associate
Duke University Medical Ctr., Dept. Pharmacology, Durham, NC

Epilepszia sejtszintü mechanizmusainak tanulmányozása
Szinaptikus kapcsolatok tanulmányozása patch clamp és optikai módszerekkel.

[1993-1995] Tudományos Munkatárs
Chinoin Co. Ltd., Központi Idegrendszeri Farmakológia
Elektofiziológiai (patch clamp) laboratórium felépítése
Ioncsatornák farmakológial tesztelése
Nátrium, Kalcium, Kálium. NMDA és GABA csatornák vizsgálata
Gógyszerfejlesztési project vezetése

[ 1989-1992 ] Tudományos Munkatárs
Richter Gedeon Co. Ltd., Biokémiai Osztály
Elektrofiziológiai módszerek fejlesztése
Memória-javitó gyógyszerek fejlesztése
Hosszu idejü potenciácio és egysejt aktivitás mérése

## Tudományos fokozatok ÉS Kitüntetések

Egyetemi Doktor (Biofizika). Eötvös Loránd Tudomány Egyetem, Budapest
Ph.D. (Neurobiológia). Pécsi Tudományegyetem, Pécs

## Egyéb szakirányú tevékenységek

## Kutatási téma

Mesterséges és természetes neuronális hálózatok tanulmányozása és létrehozása *in vitro*
Ion csatornákra ható vegyületek farmakológiai és toxikológiai vizsgálata

## Tagsági viszony

Amerikai Idegtudományi Társaság

## Oktatott tárgyak

Állatélettan, Biofizika, Biometria, Toxikológia, Tudományos cikkek elemzése
Tissue Engineering, Neuroscience, Bioinstrumentation

## Nyelvismeret

Angol, Magyar, Német

## Tanulmányutak

Bristol-i egyetem, 3 hónapos tanulmányut 1992-ben

Egy hetes Biofizikai képzés 1995-ben Erice-ben (Szicilia)

## Hobbi

Lovaglás, tollaslabdázás, kirándulás

## Szabadalmak és publikációk

US Patent 20,130,096,888 - Model and Methods for Identifying Points of Action in Electrically Active Cells. J Hickman, P Molnar, F Sommerhage, J Hood, J Jenkins.

EP Patent 2,435,585 - METHOD OF SCREENING DRUGS FOR REVERSAL OF AMYLOID BETA

NEUROTOXICITY. JJ Hickman, K Varghese, P Molnar

WO9707116 - Prolylendopeptidase inhibitors against neurodegenerative diseases, neuroprotection

WO9719934 - Quinoxaline compounds inhibitors of glutamate receptor (NMDA glycine site), neuroprotection


1. Gaál L. and **P. Molnár**, "Effects of vinpocetine on noradrenergic neurons in rat locus coeruleus," Eur. J. Pharmacol. 187:537-539 (1990)

2. Gaál L. and **P. Molnár**, "A Turbo Pascal program for on line analysis of spontaneous neuronal unit activity," In: Scientific Computing and Automation (Europe) 1990, ed.: E. J. Karjalainen, Elsevier Science Publishers B.V., Amsterdam, 1990.

3. **Molnár P**. and L. Gaál, "Effect of different subtypes of cognition enhancers on long-term potentiation in the rat dentate gyrus in vivo," Eur. J. Pharmacol. 215:17-22 (1992)

4. Tarnawa I., **P. Molnár**, L. Gaál, and F. Andrási, "Inhibition of hippocampal field potentials by GYKI 52466 in vitro and in vivo," Acta Physiol. Hungarica 79:169-175 (1992)

5. **Molnár P.**, L. Gaál, and Cs. Horváth, "The impairment of long-term potentiation in rats with medial septal lesion and its restoration by cognition enhancers," Neurobiology 2:255-266 (1994)

6. Maksay G., **P. Molnár**, and L. Gruber, "Common modes of action of g -butyrolactones and pentylenetetrazol on the convulsant and benzodiazepine sites and channel activity of the GABA receptor-ionophore complex," Eur. J. Pharmacol. - Mol. Pharmacol.Sect. 288:61-68 (1994)

7. **Molnár P.** and S.L. Erdő, "Vinpocetine is as potent as phenytoin in blocking voltage-gated sodium channels in rat cortical neurons," Eur. J. Pharmacol. 273:303-306 (1995)

8. Lakics V., **P. Molnár**, and S.L. Erdő, "Protection against veratridine toxicity in rat cortical neurons: relationship to sodium channel blockade," Neuroreport 7:89-92 (1995)

9. Maksay G., **P. Molnár**, and M. Simonyi, "Thermodinamics and kinetics of t-butylbicyclophosphorothionate binding differentiate convulsant and depressant barbiturate stereoisomers acting via GABAA ionophores," Naunyn-Schmiedebergs Archives of Pharmacology 353:306-13 (1996)

10. **Molnár P.** and S.L. Erdő, "Differential effects of five glycine site antagonists on NMDA receptor desensitization," Eur. J. Pharmacol. 311:311-314 (1996)

11. Erdő S.L., **P. Molnár**, V. Lakics, J.Zs. Bence, and Zs. Tömösközi, "Vincamin and vincanol are potent blockers of voltage-gated Na channels," Eur. J. Pharmacol. 314:69-73 (1996)

12. Okazaki M., **P. Molnar**, and J. V. Nadler, "Recurrent mossy fiber pathway in the rat dentate gyrus: synaptic currents evoked in the presence and absence of seizure-induced growth," J. Neurophysiol. 81:1645-1660 (1999)

13. **Molnar P.** and J. V. Nadler, "Mossy fiber - granule cell synapses studied with whole cell patch clamp recording and laser photostimulation," J. Neurophysiol. 82:1883-1894 (1999)

14. **Molnar P.** and J. V. Nadler, "O-(CNB-caged) GABA selectively blocks inhibitory synaptic transmission in rat hippocampal slices," Eur. J. Pharmacol 391:255-262 (2000)

15. **Molnar P.** and J. V. Nadler, "Lack of effect of mossy fiber-released zinc on postsynaptic GABAA receptors in the pilocarpine model of epilepsy," J. Neurophysiol. 85:1932-40 (2001)

16. **Molnar P.** and J. V. Nadler, "Synaptically-released zinc inhibits N-methyl-D-aspartate receptor activation at recurrent mossy fiber synapses," Brain Res. 910:205-207 (2001)

17. Feng L., **P. Molnar**, and J. V. Nadler: Short-Term Frequency-Dependent Plasticity at Recurrent Mossy Fiber Synapses of the Epileptic Brain. J. Neurosci. 23. 5381-5390 (2003)

18. Das M., **P. Molnar**, H. Devaraj, M. Poeta and J. J. Hickman: Electrophysiological and morphological characterization of rat embryonic motoneurons in a defined system. Biotechnology Progress 19. 1756-1761 (2003)

19. Kang J.F., M. Poeta, L. Riedel, M. Das, C. Gregory, **P. Molnar**, J. Hickman, "Patterned Neuronal Networks for Robotics, Neurocomputing, Toxin Detection and Rehabilitation," Proceeding of 24th Army Science Conference, Nov. 29th, 2004

20. Das M., **P. Molnar**, C. Gregory, L. M. Riedel and J. J. Hickman: Long-term culture of embryonic rat cardiomyocytes on organosilane surface in serum-free media. Biomaterials, 25: 5643-47 (2004)

21. Natarajan, A., **P. Molnar**, K. Sieverdes, A. Jamshidi and J.J. Hickman: Multielectrode Recordings of Cardiac Action Potentials as a High Throughput Method to Evaluate Pesticide Toxicity. In Vitro Toxicology, 20 (3): 375-81 (2005)

22. Mohan, D.K., **P. Molnar**, and J. J. Hickman: Toxin detection based on action potential shape analysis using a realistic mathematical model of differentiated NG108-15 cells. Biosensors and Bioelectronics, 21 (9): 1804-11 (2006)

23. Das M., Bhargava N, Gregory C, Riedel L, **Molnar P.** and Hickman JJ. Adult Rat Spinal Cord Culture on an Organosilane Surface in a Novel Serum-Free Medium. In Vitro – Animal, 41 (10): 343-8 (2005)

24. Peng P.L., Zhong, X., Tu W., Soundarapandian, M.M., **Molnar P.**, Zhu D., Lau L., Liu S. , Liu F. and Lu Y.M. ADAR2-Dependent RNA Editing of AMPA Receptor Subunit GluR2 Determines Vulnerability of Neurons in Forebrain Ischemia. Neuron, 49, 719-733 (2006)

25. Xu, T., C. Gregory, **P. Molnar**, S. Jalota, S. B. Bhaduri, T. Boland: Viability and Electrophysiology of Neural Cell Structures made by the Inkjet Printing. Biomaterials, 27. 3580-3588 (2006)

26. Das M., C. Gregory, **P. Molnar**, L. M. Riedel and J. J. Hickman: A Defined System to Allow Skeletal Muscle Differentiation and Subsequent Integration with Silicon Microstructures. Biomaterials. 27, 4374-80 (2006)

27. **Molnar P.**, M. Kuchma, A. Natarajan, J.-F. Kang, N. Bhargava, M. Das and J. J. Hickman: Photolithographical patterning of single cells and cell assemblies on commercial multielectrode arrays. Proceedings of the 5th International Meeting on Substrate-Integrated Micro Electrode Arrays, Reutlingen, Germany (2006)

28. **Molnar P.**, W. Wang, A. Natarajan, J. W. Rumsey and J. J. Hickman: Photolithographic Patterning of C2C12 Myotubes using Vitronectin as Growth Substrate in Serum-Free Medium. Biotechnology Progress, 23: 265-

268 (2007)

29. Behal A., D.M. Dawson, **P. Molnar**, and J. J. Hickman: The Stretch Reflex Arc: Simulation, Control, and Identification submitted to the Asian Journal of Control: Special Issue on Control Biology

30. Wilson K.A., **P. Molnar** and J. J. Hickman: Integration of functional myotubes with a Bio-MEMS device for non-invasive interrogation. Lab on a Chip, 7, 920-922 (2007)

31. Das, M., K. Wilson, **P. Molnar**, and J. J. Hickman: Differentiation of skeletal muscle and integration of myotubes with silicon microstructures using serum-free medium and a synthetic silane substrate. Nature Protocols, 2, 1795-1801. (2007)

32. Das, M., J. W. Rumsey, C. A. Gregory, N. Bhargava, J. F. Kang, **P. Molnar**, L. Riedel, X. Guo and J. J. Hickman: Embryonic motoneuron-skeletal muscle co-culture in a defined system. Neuroscience, 146. 481-488 (2007)

33. Natarajan A., C.J. Chun, J.J. Hickman and **P. Molnar**, :Growth and Electrophysiological Properties of Rat Embryonic Cardiomyocytes on Hydroxyl- and Carboxyl-Modified Surfaces. Journal of Biomaterials Science: Polymer Edition. 19:1319-31 (2008)

34. Rumsey, J.W., M. Das, J.-F. Kang, R. Wagner, **P. Molnar** and J. J. Hickman: Tissue engineering intrafusal fibers: Dose- and time-dependent differentiation of nuclear bag fibers in a defined in vitro system using neuregulin 1-β-1. Biomaterials, 29. 994–1004 (2008)

35. Rolland, J., K. , K. S. Lee, L. A. Mahmood, L. Fluck, J. Duarte, I. Kaya, A. Santhanam, P. Meemon, S. Murali, O. Ilegbusi, P. Kupelian, W. Warren, **P. Molnar**, J. J. Hickman and P. E. Kolattukudy, "Collaborative Engineering: 3-D Optical Imaging and Gas Exchange Simulation of In-Vitro Alveolar Constructs," Studies in health technology and informatics 132:426-432. (2008)

36. Thakore, V., A. Behal, **P. Molnar**, D. Leistritz and J.J. Hickman, "Nanoscale Nonlinear Dynamic Characterization of the Neuron-Electrode Junction," Journal of Computational and Theoretical Nanoscience, 5:2164-2169 (2008)

37. Liu, J., J.W. Rumsey, M. Das, **P. Molnar**, C. Gregory, L. Riedel, et al., "Electrophysiological and immunocytochemical characterization of DRG neurons on an organosilane surface in serum-free medium," In Vitro Cellular & Developmental Biology-Animal. 44(5-6):162-168. (2008)

38. Varghese, K., M. Das, N. Bhargava, M. Stancescu, **P. Molnar**, M. S. Kindy and J. J. Hickman, "Regeneration and characterization of adult mouse hippocampal neurons in a defined in vitro system," Journal of Neuroscience Methods: 177:51-59 (2009)

39. Dhir, V., A. Natarajan, M. Stancescu, A. Chunder, N. Bhargava, M. Das, L. Zhai, **P. Molnar**, "Patterning of diverse mammalian cell types in serum free medium with photoablation," Biotechnology Progress: 25:594-603 (2009)

40. Xu, T., **P. Molnar**, C. Gregory, M. Das, T. Boland and J.J. Hickman, "Electrophysiological characterization of embryonic hippocampal neurons cultured in a 3D collagen hydrogel," Biomaterials 30:4377-4383 (2009)

41. Murugan, R., **P. Molnar**, K. P. Rao and J. J. Hickman, ″ Biomaterial Surface patterning of self assembled monolayers for controlling neuronal cell behavior″ Int J Biomed Eng Technol. 2(2): 104–134 (2009)

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43. Ravenscroft, M.S., J. Stohlman, **P. Molnar**, A. Natarajan, H. Canavan, M. Teliska, M. Stancescu, V. Krauthamer and J.J. Hickman, "Altered Calcium Dynamics in Cardiac Cells Grown on Silane-Modified Surfaces," Biomaterials, 31(4):602-7 (2010)

44. Varghese, K., **P. Molnar**, M. Das, N. Bhargava, S. Lambert, M.S. Kindy and J.J. Hickman, "A new target for amyloid beta toxicity validated by standard and high-throughput electrophysiology," PLoS One 5:1 (2010)

45. Taylor, D. G., A. Natarajan, B. Moscato, **P. Molnar**, J. J. Hickman and S. N. Ebert, Adrenergic Deficiency Leads to Slowed Ventricular Conduction and Increased Arrhythmias in Embryonic Mouse Hearts. Circulation, 18: S616-S616 Suppl. 2. (2009)

46. Guo, X., K. Johe, **P. Molnar**, H. Davis és J. Hickman "Characterization of a human fetal spinal cord stem cell line, NSI-566RSC, and its induction to functional motoneurons." J Tissue Eng Regen Med 4(3): 181-93 (2010)

47. Edwards D, M. Das, **P. Molnar** and J.J. Hickman: Addition of glutamate to serum-free culture promotes recovery of electrical activity in adult hippocampal neurons in vitro. J Neurosci Methods. 190: 155-163 (2010)

48. **Molnár P**., A. Natarajan, I. Hernádi and J. J. Hickman "Integration of Living Cells with Electronics. First Steps towards Personalized Medicines, Functional Drug Screening and Bionic Implants" Folia Anthropologica" 9 (2010)

49. Katalin T. Rendes, **Péter Molnár**, Botond L. Buda, Gábor A. Tóth (2010): Bone maturity of 10-16-year-old children in Transdanubia (Hungary). Papers on Anthropology, XIX: 303-310.

50. Natarajan, A., M. Stancescu, V. Dhir, C. Armstrong, F. Sommerhage, J.J. Hickman, and **P. Molnar**, ″Patterned Cardiomyocytes on Microelectrode Arrays as a Functional, High Information Content Drug Screening Platform″ Biomaterials, In Press, 2011.

51. Chen, J., J. Suarez, **P. Molnar**, and A. Behal, Maximum Likelihood Parameter Estimation in a Stochastic Resonate-and-Fire Neuronal Model, in 1st IEEE International Conference on Computational Advances in Bio and medical Sciences (ICCABS) (2011)

52. Natarajan, A., M Stancescu, V Dhir, C Armstrong, F Sommerhage, JJ Hickman, **P. Molnár**: Patterned cardiomyocytes on microelectrode arrays as a functional, high information content drug screening platform. Biomaterials 32 (18), 4267-4274

53. Zhi, L., J Chen, **P Molnar**, A Behal: Weighted Least-Squares Approach for Identification of a Reduced-Order Adaptive Neuronal Model.Neural Networks and Learning Systems, IEEE Transactions on 23 (5), 834-840

54. Baker, C., DG Taylor, K Osuala, A Natarajan, P Molnar, J Hickman, S Alam, B ...Adrenergic deficiency leads to impaired electrical conduction and increased arrhythmic potential in the embryonic mouse heart. Biochemical and biophysical research communications 423 (3), 536-541

55. Thakore, V., **P Molnar**, JJ HickmanAn Optimization-Based Study of Equivalent Circuit Models for Representing Recordings at the Neuron–Electrode Interface. Biomedical Engineering, IEEE Transactions on 59 (8), 2338-2347

56. Natarajan, A., TB DeMarse, **P Molnar**, JJ Hickman: Engineered In Vitro Feed-Forward Networks. J

Biotechnol Biomater 3 (153), 2

Könyvfejezetek

1. **Molnar P.**, M. Kuchma, J. W. Rumsey, K. Wilson and J. J. Hickman: Biosurface Engineering, Cell Patterning. In: Encyclopedia of Medical Devices, John Wiley & Sons, Inc. (2006)

2. **Molnar P.**, J. F. Kang, N. Bhargava, M. Das and J. J. Hickman: Synaptic Connectivity in Engineered Neuronal Networks. In: 'Patch Clamp Methods and Protocols', Humana Press 'Methods in Molecular Biology' series (2007)

3. **Molnar P.**, and J. J. Hickman: Modeling of Action Potential Generation in NG108-15 Cells. In: 'Patch Clamp Methods and Protocols', Humana Press 'Methods in Molecular Biology' series: in press (2007)

4. Rolland, J. P., K. S. Lee, A. Mahmood, L. Fluck, J. Duarte, I. Kaya, A. Santhanam, P. Meemon, S. Murali, O. Ilegbusi, P. Kupelian, W. L. Warren, **P. Molnar**, J. J. Hickman and P. E. Kolattukudy. Collaborative Engineering: 3-D Optical Imaging and Gas Exchange Simulation of In-Vitro Alveolar Constructs. Medicine Meets Virtual Reality 16 - parallel, combinatorial, convergent: NextMed by Design. J. D. Westwood, R. S. Haluck, H. M. Hoffmanet al. 132. (2008)

5. Murugan, R., S.S. Liao, S. Ramakrishna, **P. Molnar**, Z.M. Huang, M. Kotaki, K.P. Rao, and J.J. Hickman, Skeletal Regenerative Nanobiomaterials, in Biomaterials for Bone Regenerative Medicine., TTP Publishers: Swiss/USA. (2009)

Editor: 'Patch Clamp Methods and Protocols' for Humana Press 'Methods in Molecular Biology' series (2007)