C.V.

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1971 - MD, Medical School University of Zagreb,
1975 - M.Sc.: Postgraduate Study for Scientific Perfection in Biology, University of Zagreb.
1976 - Ph.D. (or DSc); University of Zagreb.
1979 – Docent,
1979-1981. Visiting Scientist, Laboratory of Preclinical Pharmacology, National Institute for Mental Health, Washington DC, USA.
1984 - Professor in Pharmacology, Medical School of Zagreb.
1994-1995 Established Visiting Scientist at Department of Biology, Abo Akademi University, Turku, Finland
1998. re-elected to full-time Professor in Pharmacology
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Research:

Initially worked with M. Bulat on issues of CSF dynamics (Science 1974). First investigated the presence of monoamines in the spinal cord of man and in the brain of patients with diabetes mellitus. Developed a HPLC method for measuring serotonin and its metabolites in biological material. Disovered that compensatory growth, after the removal of one of the parental organs: the adrenal glands or ovaries mediated by nervous innervation, accompanied by change in the signaling of specific receptors. The phenomenon has not been sufficiently explained to date. Discovery of catabolism of dopamine in peripheral tissues and a hypothesis that it is a peripheral neurotransmitter (1979-1981).
Recent: Discovery of axonal transport of botulinum toxin type A in sensory nerves from peripheral injection to CNS, wher it modulates antinociceptive edffect of toxin. Discovery of neurogenic inflammation of meninges as a nonspecific reaction to pain in regons of head and neck with sensory inervation of nerves. Mechanism (at least a part): colocalisation of butulinum toxin type A and CGRP in meningeal nerves and prevention of release of CGRP.

World of Science (WoS 12/05/2018; all Data Bases) 128 publication (in addition about 200 in other journals or monographs, 150 abstracts), citation 1455, H index 22.

30 invited lectures in foreign universities and at international conferences and 37 invited lectures related to PhD programms (as ORPEHUS President). Supervisor in 14 MSc or PhD thesis.

Single author of the book**:** Neurotransmitters in health and disease (in Croatian), Medicinski fakultet Sveučilišta u Zagrebu, Zagreb, 1994. (295 pp), Coauthor /Eitor of of the book: *Medical Pharmacology* (textbook, In Croatian), Medicinska naklada Zagreb 1999, and 14 other monographs

Other activities

- (1984-1991) Dean for Science, Faculty of Medicine
- (1998 – 2017). Founder and Head of Ph.D. Program: Biomedicine and Health Sciences, Faculty of Medicine)
- (2006 - 2017). Member of the Executive Committee of the Association of Medical Schools of Europe
- (2004-2014) Founder and First President of the European Association of PhD Programs in Biomedicine and Health: ORPHEUS (Organization for PhD Education in Biomedicine and Health Sciences in European System, (www: Orpheus-med.org), 2014 Honorary Member

- Reviewer of scientific projects in the field of biomedicine of the MSES, the Republic of Slovenia's Research Agency, the Bulgarian Science Foundation, the Portuguese Agency for Science and Technology (FCT)
- Evaluator of Doctoral Studies in Stokholmu (Karolinska), Rekjavik and Ankara (Hacettepe)
- Ad hock reviewer in Pain, Brit J Pharmacol, J Neurochem, Life Sci, Pain, Toxicon, J Neural Transmission and others.

Awards

- 2003. Acknowledgment of the Ministry of Science, Education and Sport of the Republic of Croatia 2003 (for the organization of educational actions in schools on drug dependence)
- 2004. Regular member of the Academy of Medical Sciences of Croatia
- 2013. Annual State Award for Science, in the field of biomedical sciences, "*for a scientifically significant discovery of axonal transport and central action of botulinum toxins on pain*" (Croatian Parliament, Zagreb 2013)
- 2013. Honorary Professor of State Medical University of Karaganda
- 2014. Honorary Member of ORPHEUS (ORPEHUS: Organization for PhD Education in Biomedicine and Health)

List of publications on botulinum toxin

- Bach-Rojecky L, Relja M, Lacković Z. (2005) Botulinum toxin type A in experimental neuropathic pain. J Neural Transm. 112:215-
- Bach-Royecky L, Lacković Z. (2005) Antinociceptive effect of botulinum toxin type a in rat model of carrageenan and capsaicin induced pain. Croat Med J.;46(2):201-8.
- Bach-Rojecky L, Dominis M, Lacković Z. (2008) Lack of anti-inflammatory effect of botulinum toxin type A in experimental models of inflammation. Fundam Clin Pharmacol. 22; 503–509
- Lacković Z, Rebić V, Riederer P. (2009), Single intracerebroventricular injection of botulinum toxin type A produces slow onset and long-term memory impairment in rats. // Journal of Neural Transmission. 116; 10; 1273-1280,
- Bach-Rojecky L, Lacković Z. (2009) Central origin of the antinociceptive action of botulinum toxin type A. Pharmacol Biochem Behav 94, 234-238.
- Filipović B, Bach-Rojecky L, Lacković Z. (2010) Lasting reduction of postsurgical hyperalgesia after single injection of botulinum toxin type A in rat. Fundamen Clin Pharmacol 24: 43-45.
- Bach-Rojecky L, Šalković-Petrišić M, Lacković Z (2011) Botulinum toxin type A reduces pain supersensitivity in experimental diabethic neuropathy: bilateral effects after unilateral injection. Eur J Pharmacol 633: 10-14.
- Matak I, Bach-Rojecky L, Filipović B, Lacković Z (2011). Behavioral and immunohistochemical evidence for central antinociceptive activity of botulinum toxin Neuroscience. 2011 Jul 14;186:201-7. doi: 10.1016/j.neuroscience.2011.04.026. Epub 2011 Apr 20
- Matak I, Riederer P, Lacković Z (2012). Botulinum toxin's axonal transport from periphery to the spinal cord. Neurochem Int. 61(2):236-9. doi: 10.1016/j.neuint.2012.05.001. Epub 2012 May 8.
- Drinovac V, Bach-Rojecky L, Matak I, Lacković Z. (2013) Involvement of μ-opioid receptors in antinociceptive action of botulinum toxin type A. Neuropharmacology 70: 331-337.
- Matak I, Stracenski I, Lacković Z. (2013). Comparison of analgesic effects of single versus repeated injection of botulinum toxin in orofacial formalin test in rats. J Neural Transm. 120(1):141-4. doi: 10. 1007/s00702-012-0846-3.
- Filipovic B, Matak I, Bach-Rojecky L, Lacković Z. (2012) Central action of peripherally applied botulinum toxin type A on pain and dural extravasation in rat model of trigeminal neuropathy. PLoS ONE 7(1): e29803.
- Matak I, Rosetto O, Lacković Z. (2014). Botulinum toxin type A selectivity for certain types of pain is associated with capsaicin-sensitive neurons. Botulinum toxin type A selectivity for certain types of pain is associated with capsaicin-sensitive neurons. Pain. 2014 May 2. pii: S0304-3959(14)00206-1. doi: 10. 1016/j. pain. 2014. 04. 027.
- Drinovac V, Bach-Rojecky L, Lacković Z. (2014). Association of antinociceptive action of botulinum toxin type A with GABA-A receptor. J Neural Transm. 2014; 121:665-9. doi: 10. 1007/s00702-013-1150-6.

- Drinovac V, Bach-Rojecky L, Babić A, Lacković Z. (2014). Antinociceptive effect of botulinum toxin type A on experimental abdominal pain. Eur J Pharmacol. 15;745:190-5. doi: 10.1016/j.ejphar.2014.10.038. Epub 2014 Oct 30.
- Filipović B, Matak I, Lacković Z. (2014). Dural neurogenic inflammation induced by neuropathic pain is specific to cranial region. J Neural Transm. 2014;121(5):555-63. doi: 10. 1007/s00702-013-1144-4.
- Matak I, Rossetto O, Lacković, Z. (2014) Botulinum toxin type A selectivity for certain types of pain is associated with capsaicin-sensitive neurons. Pain. 155, 1516-1526.
- Matak, I. Lacković, Z. (2014) Botulinum toxin A, brain and pain. Prog Neurobiol. 119-120, 39-59
- Matak I, Lacković Z. (2015). Botulinum neurotoxin type A: Actions beyond SNAP-25? Toxicology. 335:79-84. Review
- Lacković Z, Filipović B, Matak I, Helyes Z. (2016). Botulinum toxin type A activity in cranial dura: implications for treatment of migraine and other headaches. Br J Pharmacol. doi: 10. 1111/bph. 13366.
- Matak I, Lacković Z, Relja M. (2016). Botulinum toxin type A in motor nervous system: unexplained observations and new challenges. J Neural Transm (Vienna). 123(12):1415-1421.
- Drinovac Vlah V, Bach-Rojecky L, Lacković Z. (2016) Antinociceptive action of botulinum toxin type A in carrageenan-induced mirror pain. J Neural Transm (Vienna). 2016;123(12):1403-1413.
- Ibragić S, Matak I, Dračić A, Smajlović A, Muminović M, Proft F, Sofić E, Lacković Z, Riederer P. (2016). Effects of botulinum toxin type A facial injection on monoamines and their metabolites in sensory, limbic and motor brain regions in rats. Neurosci Lett. 23;617:213-7. doi: 10. 1016/j. neulet. 2016. 02. 020.
- Matak I, Tékus V, Bölcskei K, Lacković Z, Helyes Z. (2017). Involvement of substance P in the antinociceptive effect of botulinum toxin type A: Evidence from knockout mice. Neuroscience. 2017;358:137-145. doi: 10. 1016/j. neuroscience. 2017. 06. 040.
- Drinovac Vlah V, Filipović B, Bach-Rojecky L, Lacković Z. (2018). Role of central versus peripheral opioid system in antinociceptive and anti-inflammatory effect of botulinum toxin type A in trigeminal region. Eur J Pain. 22(3):583-591. doi: 10.1002/ejp.1146. Epub 2017 Nov 13.

Complete list of publications:
https://orcid.org/0000-0001-6338-3609
https://www.ncbi.nlm.nih.gov/pubmed/?term=Lackovic+Z
https://www.researchgate.net/profile/Zdravko_Lackovic2

Zdravko Lacković
Zagreb, May 12th, 2018