

OSOBNJE INFORMACIJE

Nada Božina

ZVANJE

doktor medicine

TITULA

prof. dr. sc.

RADNO ISKUSTVO

10.2021 -

Profesor

Medicinski fakultet Sveučilište u Zagrebu, Zavod za farmakologiju, Šalata 3

Dodiplomska i poslijediplomska nastava iz farmakologije, farmakogenomike;
Voditelj međunarodnog projekta ERA PerMed; Konzultant na Uspostavnom projektu
HRZZ; Mentorstvo doktorata

04.2011 -

Pročelnik Kliničke jedinice za farmakogenomiku i individualizaciju terapije

Klinički bolnički centar Zagreb, 10 000 Zagreb, Kišpatićeva 12, www.kbc-zagreb.hr

www.kbc-zagreb.hr

Organizator i voditelj farmakogenetičkih ispitivanja u akreditiranom laboratoriju sa
svrhom testiranja na genetičku predispoziciju za neočekivan-promijenjen odgovor
na primijenjenu farmakoterapiju. Testiranja uključuju polimorfizme gena koji kodiraju
metaboličke enzime faze I i II, transportnih proteina te receptora.

12.1997 - 03.2011

Voditelj laboratorija za farmakogenetiku

Klinički bolnički centar Zagreb, Kišpatićeva 12, 10 000 Zagreb, www.kbc-zagreb.hr

www.kbc-zagreb.hr

Organizacija rada laboratorija za farmakogenetiku i provođenje farmakogenetičkih
testiranja

06.1987 - 11.1997

Voditelj laboratorija za stanične kulture u Centru za biomedicinska
istraživanja

Klinički bolnički centar zagreb, Šalata 2, 10 000 Zagreb

Organiziranje rada u Laboratoriju za stanične kulture te provođenje testiranja
aktivnosti i toksičnosti potencijalnih lijekova testovima in vitro

04.1983 - 05.1987

Analitičar u laboratoriju za stanične kulture

Klinički bolnički centar Zagreb

10.1979 - 03.1983

specijalizant na Klinici za unutarnje bolesti

Klinički bolnički centar

10.1977 - 09.1979

pripravnik

Klinički bolnički centar Zagreb

OBRAZOVANJE I OSPOSOBLJAVANJE

10.2000 - 10.2005	doktor biomedicinskih znanosti Medicinski fakultet Sveučilišta u Zagrebu
10.1978 - 07.1980	magistar medicinskih znanosti Medicinski fakultet Sveučilišta u Zagrebu
10.1972 - 07.1977	doktor medicine Medicinski fakultet Sveučilišta u Zagrebu

OSOBNJE VJEŠTINE

Materinski jezik hrvatski

Ostali jezici	RAZUMIJEVANJE		GOVOR		PISANJE
	Slušanje	Čitanje	Govorna interakcija	Govorna produkcija	
engleski	C1/2: Iskusni korisnik	C1/2: Iskusni korisnik	B1/2: Samostalni korisnik	B1/2: Samostalni korisnik	B1/2: Samostalni korisnik

Komunikacijske vještine 2018. COST Association- CA17130 (The Action Enhancing Psychiatric Genetic Counselling, Testing, and Training in Europe – EnGagE)

Organizacijske / rukovoditeljske vještine 2020. Organizacija "Better Future of Healthy Ageing" Conference Iskustvo u organizaciji rada i rukovođenju laboratorijem a trenutno organizacijom rada i upravljanje poslovima u Kliničkom odjelu.
Od 2019 predsjednica Hrvatskog društva za farmakogenomiku i personaliziranu terapiju.
Organizirala tečajeve trajnog usavršavanja i simpozij:
2019. Farmakogenomika u personaliziranoj medicini
2015. Znanstveni odbor, EPST Integration of Pharmacogenomics in clinical decision support
2015. Znanstveni odbor VI. hrvatski kongres humane genetike
2013-tečaj "Farmakogenomika i farmakovigilancija - sprječavanje nuspojava u individualizaciji terapije - upute i smjernice"
2013 Suorganizator simpozija "GoldenHelix Pharmacogenomics Day", Zagreb

Poslovne vještine

Računalne vještine Microsoft Windows, Office

Vozačka dozvola

B kategorija

DODATNE INFORMACIJE

Izdanja

1. Šimičević L, Canjuga I, Zibar L, Borić-Bilušić A, Ganoci L, Božina N. Rapid clearance of tacrolimus blood concentration triggered by variant pharmacogenes. *J Clin Pharm Ther.* 2022 Sep;47(9):1461-1465.
2. Weber H, Maihofer AX, Jaksic N, Bojic EF, Kucukalic S, Džananovic ES, Uka AG, Hoxha B, Haxhibeqiri V, Haxhibeqiri S, Kravic N, Umihanic MM, Franc AC, Babic R, Pavlovic M, Mehmedbasic AB, Aukst-Margetic B, Kucukalic A, Marjanovic D, Babic D, Božina N, Jakovljevic M, Sinanovic O, Avdibegović E, Agani F, Warrings B, Domschke K, Nievergelt CM, Deckert J, Džubur-Kulenovic A, Erhardt A. Association of polygenic risk scores, traumatic life events and coping strategies with war-related PTSD diagnosis and symptom severity in the South Eastern Europe (SEE)-PTSD cohort. *J Neural Transm (Vienna).* 2022 Jun;129(5-6):661-674.
3. Božina N, Bilić I, Ganoci L, Šimičević L, Pleština S, Lešnjaković L, Trkulja V. DPYD polymorphisms c.496A>G, c.2194G>A and c.85T>C and risk of severe adverse drug reactions in patients treated with fluoropyrimidine-based protocols. *Br J Clin Pharmacol.* 2022 May;88(5):2190-2202.
4. Merćep I, Radman I, Trkulja V, Božina T, Šimičević L, Budimir E, Ganoci L, Božina N. Loss of function polymorphisms in SLCO1B1 (c.521T>C, rs4149056) and ABCG2 (c.421C>A, rs2231142) genes are associated with adverse events of rosuvastatin: a case-control study. *Eur J Clin Pharmacol.* 2022 Feb;78(2):227-236.
5. Božina N, Ganoci L, Šimičević L, Gvozdanović K, Domjanović IK, Fistrek Prlić M, Križ T, Borić Bilušić A, Laganović M, Božina T. Drug-drug-gene interactions as mediators of adverse drug reactions to diclofenac and statins: a case report and literature review. *Arh Hig Rada Toksikol.* 2021 Jun 28;72(3):114-128.
6. Turner RM, Radman I, Božina N, Alfirevic A. Pharmacogenetics and statin-related myopathy: what do we know? *Pharmacogenomics.* 2020;21(12):821-825.
7. Ganoci L, Trkulja V, Živković M, Božina T, Šagud M, Lovrić M, Božina N. ABCB1, ABCG2 and CYP2D6 polymorphism effects on disposition and response to long-acting risperidone. *Prog Neuropsychopharmacol Biol Psychiatry.* 2021;104:110042.
8. Božina N, Vrkić Kirhmajer M, Šimičević L, Ganoci L, Mirošević Skvrce N, Klarica Domjanović I, Merćep I. Use of pharmacogenomics in elderly patients treated for cardiovascular diseases. *Croat Med J.* 2020;61(2):147-158.
9. Kuruc Poje D, Božina N, Šimičević L, Žabić I. Severe hyperglycaemia following pazopanib treatment: The role of drug-drug-gene interactions in a patient with metastatic renal cell carcinoma-A case report. *J Clin Pharm Ther.* 2020;45(4):628-631.
10. Skvrce NM, Krivokapić S, Božina N. Implementation of pharmacogenomics in product information. *Pharmacogenomics.* 2020;21(7):443-448.
11. Živkovic M, Mihaljevic-Peles A, Muck-Seler D, Šagud M, Ganoci L, Vlatkovic S, Tudor L, Pivac N, Božina N. Remission Is not Associated with DRD2 rs1800497 and DAT1 rs28363170 Genetic Variants in Male Schizophrenic Patients after 6-months Monotherapy with Olanzapine. *Psychiatr Danub.* 2020;32(1):84-91.
12. Samardžić J, Božina N, Skoric B, Ganoci L, Krpan M, Petricevic M, Pasalic M, Božina T, Pavasovic S, Cikes M, Milicic D. Impact of Continuous P2Y12 Inhibition Tailoring in Acute Coronary Syndrome and Genetically Impaired Clopidogrel Absorption. *J Cardiovasc Pharmacol.* 2020;75(2):174-179.
13. Bosnjak Kuharic D, Božina N, Ganoci L, Makaric P, Kekin I, Prpic N, Božina T, Rojnic Kuzman M. Association of HSPA1B genotypes with psychopathology and neurocognition in patients with the first episode of psychosis: a longitudinal 18-month follow-up study. *Pharmacogenomics J.* 2020;20(5):638-646.
14. Pejanovic-Skobic N, Markovic I, Božina N, Basic S. Lack of association of SCN2A rs17183814 polymorphism with the efficacy of lamotrigine monotherapy in patients with focal epilepsy from Herzegovina area, Bosnia and Herzegovina. *Epilepsy Res.* 2019;158:106221.
15. Božina N, Sporiš IŠ, Božina T, Klarica-Domjanović I, Tvrdeić A, Sporiš D. Pharmacogenetics and the treatment of epilepsy: what do we know? *Pharmacogenomics.* 2019;20(15):1093-1101.
16. Rojnic Kuzman M, Bosnjak Kuharic D, Ganoci L, Makaric P, Kekin I, Rossini Gajsak L, Prpic N, Božina T, Bajic Z, Božina N. Association of CNR1 genotypes with changes in neurocognitive performance after eighteen-month treatment in patients with first-episode psychosis. *Eur Psychiatry.* 2019;61:88-96.
17. Jaksic N, Šabić Džananović E, Aukst Margetic B, Rudan D, Cima Franc A, Božina N, Ferić Bojić E, Kučukalić S, Džubur Kulenović A, Marjanović D, Avdibegović E, Babić D, Agani F, Kučukalić A, Bravo Mehmedbašić A, Kravic N, Muminović Umihanić M, Sinanović O, Babić R, Pavlović M, Haxhibeqiri S, Goci Uka A, Hoxha B, Haxhibeqiri V, Ziegler C, Wolf C, Warrings B, Domschke K, Deckert J, Jakovljevic M. A Candidate Gene Association Study of FKBP5 and CRHR1 Polymorphisms in Relation to War-Related Posttraumatic Stress Disorder. *Psychiatr Danub.* 2019;31(2):269-275.
18. Hoxha B, Goçi Uka A, Agani F, Haxhibeqiri S, Haxhibeqiri V, Sabic Džananovic

- E, Kucukalic S, Bravo Mehmedbasic A, Kucukalic A, Dzubur Kulenovic A, Ferić Bojić E, Marjanovic D, Kravic N, Avdibegovic E, Muminovic Umihanić M, Jaksic N, Cima Franc A, Rudan D, Jakovljevic M, Babic R, Pavlovic M, Babic D, Aukst Margetic B, Bozina N, Sinanovic O, Ziegler C, Warrings B, Domschke K, Deckert J, Wolf C, Vyshka G. The Role of TaqI DRD2 (rs1800497) and DRD4 VNTR Polymorphisms in Posttraumatic Stress Disorder (PTSD). *Psychiatr Danub.* 2019;31(2):263-268.
19. Goçi Uka A, Agani F, Blyta A, Hoxha B, Haxhibeqiri S, Haxhibeqiri V, Sabic Džananovic E, Kucukalic S, Bravo Mehmedbasic A, Kucukalic A, Dzubur-Kulenovic A, Ferić Bojić E, Marjanovic D, Kravic N, Avdibegovic E, Muminovic Umihanic M, Jaksic N, Cima Franc A, Rudan D, Jakovljevic M, Babic R, Pavlovic M, Babic D, Aukst Margetic B, Bozina N, Sinanovic O, Ziegler C, Warrings B, Domschke K, Deckert J, Wolf C. Role of the Allelic Variation in the 5-Hydroxytryptamine Receptor 1A (HTR1A) and the Tryptophan Hydroxylase 2 (TPH2) Genes in the Development of PTSD. *Psychiatr Danub.* 2019;31(2):256-262.
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22. Ferić Bojić E, Kučukalić S, Džubur Kulenović A, Avdibegović E, Babić D, Agani F, Jakovljević M, Kučukalić A, Bravo Mehmedbašić A, Šabić Džananović E, Kravic N, Babić R, Pavlović M, Aukst Margetic B, Jaksic N, Cima Franc A, Rudan D, Haxhibeqiri S, Goci Uka A, Hoxha B, Haxhibeqiri V, Muminović Umihanić M, Sinanović O, Božina N, Ziegler C, Wolf C, Warrings B, Domschke K, Deckert J, Marjanović D. Associations of Gene Variations in Neuropeptide Y and Brain Derived Neurotrophic Factor Genes with Posttraumatic Stress Disorder. *Psychiatr Danub.* 2019;31(2):227-234.
23. Kučukalić S, Ferić Bojić E, Babić R, Avdibegović E, Babić D, Agani F, Jakovljević M, Kučukalić A, Bravo Mehmedbašić A, Šabić Džananović E, Marjanović D, Kravic N, Pavlović M, Aukst Margetic B, Jaksic N, Cima Franc A, Rudan D, Haxhibeqiri S, Goci Uka A, Hoxha B, Haxhibeqiri V, Muminović Umihanić M, Sinanović O, Božina N, Ziegler C, Wolf C, Warrings B, Domschke K, Deckert J, Džubur Kulenović A. Genetic Susceptibility to Posttraumatic Stress Disorder: Analyses of the Oxytocin Receptor, Retinoic Acid Receptor-Related Orphan Receptor A and Cannabinoid Receptor 1 Genes. *Psychiatr Danub.* 2019;31(2):219-226.
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25. Rojnic Kuzman M, Makaric P, Bosnjak Kuharic D, Kekin I, Rossini Gajsak L, Boban M, Bozina N, Bozina T, Celic Ruzic M, Darmopil S, Filipcic I, Ganoci L, Hladnik A, Madzarac Z, Malojcic B, Mihaljevic Peles A, Mueller DJ, Ostojic D, Petanjek Z, Petrovic R, Vogrinc Z, Savic A, Silic A, Sagud M, Zivkovic M, Bajic Z. Integration of complementary biomarkers in patients with first episode psychosis: research protocol of a prospective follow up study. *Psychiatr Danub.* 2019;31(2):162-171
26. Markovic I, Pejanovic-Skobic N, Bozina N, Susak Sporis I, Sporis D, Basic S. The lack of influence of IVS5-91 G>A polymorphism of the SCN1A gene on efficacy of lamotrigine in patients with focal epilepsy. *Neurol Res.* 2019;41(10):930-935.
27. Zivkovic M, Mihaljevic-Peles A, Muck-Seler D, Sagud M, Ganoci L, Vlatkovic S, Nikolac Perkovic M, Tudor L, Bozina N, Pivac N. The lack of association between COMT rs4680 polymorphism and symptomatic remission to olanzapine monotherapy in male schizophrenic patients: A longitudinal study. *Psychiatry Res.*

2019;279:389-390.

28. Škarić-Jurić T, Tomas Ž, Zajc Petranović M, Božina N, Smolej Narančić N, Janičijević B, Salihović MP. Characterization of ADME genes variation in Roma and 20 populations worldwide. *PLoS One*. 2018;13(11):e0207671
29. Grubelić Ravić K, Paić F, Vucelić B, Brinar M, Čuković-Čavka S, Božina N, Krznarić Ž, Kalauz M, Bešić D, Nikuševa Martić T. Association of polymorphic variants in serotonin re-uptake transporter gene with Crohn's disease: a retrospective case-control study. *Croat Med J*. 2018;59(5):232-243
30. Klarica Domjanović I, Lovrić M, Trkulja V, Petelin-Gadže Ž, Ganoci L, Čajić I, Božina N (2018). Interaction between ABCG2 421C>A polymorphism and valproate in their effects on steady-state disposition of lamotrigine in adults with epilepsy. *Br J Clin Pharmacol*. 2018;84(9):2106-2119.
31. Bielen L, Kralj I, Čurčić E, Vodanović M, Boban A, Božina N. Acute kidney injury, agranulocytosis, drug-induced liver injury, and posterior reversible encephalopathy syndrome caused by high-dose methotrexate-possible role of low activity ABC and SLC drug transporters. *Eur J Clin Pharmacol*. 2018;74(9):1191-1192.
32. Vrkić Kirhmajer M, Macolić Šarinić V, Šimičević L, Ladić I, Putarek K, Banfić L, Božina N. Rosuvastatin-Induced Rhabdomyolysis - Possible Role of Ticagrelor and Patients' Pharmacogenetic Profile. *Basic Clin Pharmacol Toxicol*. 2018;123(4):509-518.
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36. Krasniqi V, Dimovski A, Bytyqi HQ, Eftimov A, Šimičević L, Božina N. Genetic polymorphisms of CYP2C9, CYP2C19, and CYP3A5 in Kosovar population. *Arh Hig Rada Toksikol*. 2017;68(3):180-184.
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41. Ganoci L, Božina T, Mirošević Skvrce N, Lovrić M, Mas P, Božina N. Genetic polymorphisms of cytochrome P450 enzymes: CYP2C9, CYP2C19, CYP2D6, CYP3A4, and CYP3A5 in the Croatian population. *Drug Metab Pers Ther*. 2017;32(1):11-21.
42. Šagud M, Vuksan-Ćusa B, Božina N, Lovrić M, Mihaljević-Peleš A, Kramarić M. Olanzapine Long-Acting Injections After Neuroleptic Malignant Syndrome: Two Case Reports. *J Clin Psychopharmacol* 2016;36(6):733-735.
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- Leod HL, van der Spek PJ, Patrinos GP. A European Spectrum of Pharmacogenomic Biomarkers: Implications for Clinical Pharmacogenomics. *PLoS One*. 2016;11(9):e0162866.
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Prezentacije

- 4.6. pozvano predavanje na konferenciji Better Future of Healthy Ageing, s temom Farmakogenomika .
23.10.2018. Primjenjena genomika-precizna medicina, pozvano predavanje: Dometi farmakogenomike u preciznoj medicini.
12.12.2018.Hrvatsko društvo farmakologije (HDF): edukativni simpozij „Aktualne teme iz farmakologije“. Božina N. Farmakogenomika u kliničkoj praksi: preporuke i smjernice, Zagreb,

Projekti

2022. Međunarodni projekt ERA PerMed "Artificial intelligence for personalised medicine in depression - analysis and harmonization of clinical research data for robust multimodal patient profiling for the prediction of therapy outcome" voditelj za Hrvatsku

2021. konzultant na uspostavnom HRZZ projektu "Pharmacogenomics in prediction of cardiovascular drugs adverse reaction- PGx-CardioDrug

2018.- COST Association- CA17130 (The Action Enhancing Psychiatric Genetic Counselling, Testing, and Training in Europe – EnGagE)

2018. - suradnik na projektu , Potpora Sveučilišta u Zagrebu, "Uloga genskog polimorfizma metaboličkih enzima citokroma P450(CYP) kao čimbenika hepatotoksičnosti"

2017. Voditelj projekta , potpora Sveučilišta u Zagrebu“ Uloga farmakogenetike u interakcijama i nuspojavama opioidnih lijekova“

2013- Voditelj projekta:“Farmakogenomika i farmakovigilancija - sprečavanje nuspojava u individualizaciji terapije”.

Suradnik na međunarodnom projektu,

2013.Suradnja sa Sveučilištem u Würzburgu na projektu "Molecular Basis of Neuropsychiatric Disorders“, podprojekt "Molecular Mechanisms of Posttraumatic Stress Disorder“, financiran od Deutscher Akademischer Austauschdienst (DAAD), Stability Pact for South Eastern Europe.

Suradnik na projektu Sveučilišta: "Farmakogenomko ispitivanje u djece s idiopatskim nefrotskim sindromom" (voditelj prof.dr.sc. D. Milošević)

Suradnik na projektima MZOS: od 2006. „Funkcijska genomika i proteomika rizičnih čimbenika ateroskleroze“ (voditelj prof.dr.sc. J.Sertić); „Farmakogenetska varijabilnost u psihijatrijskih bolesnika“ (voditelj prof.dr.sc. A. Mihaljević Peleš); „Upalne bolesti crijeva“ (voditelj prof.dr.sc. B. Vucelić)

2002-2006 "Molekularna osnova aterogeneze voditelj prof.dr.sc. A. Stavljenić Rukavina)

Konferencije

2022. Pozvani predavač na ESHG Pharmacogenetics Course , Portorož Slovenija, September 21-24

2022. Voditelj simpozija Farmakogenomika - 10th Croatian Congress of Pharmacology with International Participation & 1st Croatian Congress of Clinical Pharmacology, Rujan 22-25

Sudjelovala kao pozvani predavač na konferencijama i simpozijima s temama farmakologija i toksikologija, sigurnost primjene lijeka, farmakogenomika

Priznanja i nagrade

Nagrade na simpozijima:

2013. Falk Symposium, London: Coća M, Cukovic-Cavka S, Božina N, Brinar M, Crncevic Urek M, Turk N, Krznic Z, Vucelic B. "Inosine Triphosphate Pyrophosphatase And Xanthine Oxidase Gene Variability in Croatian Inflammatory Bowel Disease Patients"

2012. 2nd EFCC-UEMS Congress "Laboratory Medicine at the Clinical Interface", Mirošević Skvrce N, Božina N, Pejnović L, Barišić I, Zibar L, Macolić-Šarinić V. "ABCG2 Gene Variant And Fluvastatin Adverse Drug Reactions in Renal Transplant Recipients"

2012. Deveti psihijatrijski dani: Vlatkovic S, Zivkovic M, Mihaljevic-Peles A, Sagud M, Božina N. Pisa Syndrome And Bipolar Affective Disorder.

2006. XIV World Congress on Psychiatric Genetics: Božina N, Mihaljević-Peleš A, Šagud M, Jakovljević M, Sertić J."Serotonin Transporter Polymorphism And Paroxetine Drug Response in Major Depression Disorder"

2001. III Hrvatski kongres farmakologije: Božina N, Tramišak I, Medved V, Mihaljević-Peleš A, Granić P, Stavljenić-Rukavina A. "CYP2D6 Genotype And Psychotropic Drug-Induced Adverse Effects".

Članstva

Hrvatsko društvo za farmakogenomiku i personaliziranu terapiju, Hrvatsko društvo farmakologa
Hrvatsko društvo za humanu genetiku
Hrvatsko društvo za biologijsku psihijatriju
European Society of Pharmacogenomics and Personalised Therapy (ESPT), International Association of therapeutic drug monitoring and clinical toxicology, European Society of Human Genetics
Hrvatski predstavnik u European Medicines Agency (EMA) Scientific Committee and working party meetings, European Network of Centre for Pharmacoepidemiology and Pharmacovigilance (ENCePP) i u Pharmacogenomics working party