

## Opis delovnega mesta mladega raziskovalca/ke (*Description of the Young Researcher's position*)

1. Članica UL (*UL member*):

Univerza v Ljubljani, Veterinarska fakulteta, Inštitut za mikrobiologijo in parazitologijo  
University of Ljubljana, Veterinary Faculty, Institute of Microbiology and Parasitology

2. Ime, priimek in elektronski naslov mentorja/ice (*Mentor's name, surname and email*):

Irena Zdovc, irena.zdovc@vf.uni-lj.si

3. Raziskovalno področje (*Research field*):

4.04.02 Veterina / Veterinary Medicine

4. Opis delovnega mesta mladega raziskovalca/ke (*Description of the Young Researcher's position*):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce.

*slo:*

Mladi raziskovalec se bo usposabljal na Inštitutu za mikrobiologijo in parazitologijo (IMP), Enota za bakteriologijo in mikologijo (EBM), kjer bo tudi njegovo osnovno delovno mesto. Težišče usposabljanja bo na področju ugotavljanja odpornosti bakterij proti protimikrobnim zdravilom, predvsem pri bakterijah, ki jih izoliramo iz različnih patoloških procesov pri domačih živalih in iz njihovega življenjskega okolja. Sodeloval bo tudi pri proučevanju iatrogenih okužb, ki postajajo pogostejše in zanimive tudi v veterinarski medicini. Posebej se bo posvetil proučevanju lastnosti koagulazno pozitivnih stafilokokov, predvsem bakterije *Staphylococcus pseudintermedius*, ki je sicer del običajne mikrobiote kože in sluznic zdravih mesojedov, v določenih okoliščinah pa lahko ena izmed pomembnejših patogenih bakterij. Najpogostejše obolenje je piodermija, ki se pogosto pojavi na poškodovani koži, predvsem pri živalih z atopičnim dermatitisom. *S. pseudintermedius* ima številne faktorje patogenosti, ki so zelo podobni ali enaki, kot so opisani pri bakteriji *S. aureus*, vendar o vlogi teh proteinov med okužbo ni veliko znanega. Za sprožitev okužbe *S. pseudintermedius* sintetizira različne beljakovine, kot so adhezini, ki vežejo molekule zunajceličnega matriksa in tako spodbujajo kolonizacijo. Zaradi razmnoževanja bakterij se aktivira mehanizem, ki spodbuja proizvodnjo eksoproteinov, kot so eksfoliativni toksini in levkocidini, kar spodbuja širjenje bakterij na druga mesta telesa in vodi v razvoj resnejših sistemskih obolenj.

Poseben problem predstavljajo izolati, ki so odporni proti meticilinu (MRSP) in kažejo podoben vzorec odpornosti kot MRSA pri ljudeh, poleg tega pa številni podatki kažejo tudi na njegov zoonotični pomen. Sistemske okužbe z MRSP pomenijo velik problem za zdravljenje živali, ker so taki izolati odporni proti vsem betalaktamskim antibiotikom, praviloma pa tudi proti vsem drugim antibiotikom, ki so registrirani za uporabo v veterinarski medicini. Zaradi tega je potrebno razvijati nove strategije zdravljenja in ena izmed njih je tudi uporaba avtovakcin. Raziskovalno delo mladega raziskovalca bo potekalo na IMP, kjer bo osvojil različne tehnike mikrobiološke preiskave, s poudarkom na ugotavljanju odpornosti bakterij proti antibiotikom z mikrodilucijsko metodo. Poleg klasičnih bakterioloških tehnik bo uporabljal tudi modernejše metode za izolacijo in identifikacijo bakterij (npr. masno spektrofotometrijo z napravo MALDI-TOF) in molekularne metode, s katerimi bo proučeval faktorje patogenosti in odpornosti, podatke pa uporabljal v diagnostične in epidemiološke namene. Sodeloval bo tudi pri izdelavi in proučevanju stafilokoknih avtovakcin. Od kandidata pričakujemo zanimanje in sposobnosti za znanstvenoraziskovalno delo, aktivno znanje angleškega jezika in pripravljenost za delo v skupini. Zaželeno je tudi veselje do dela v mikrobiološkem laboratoriju, kjer bo opravljal večino svojih preiskav.

*eng:*

The young researcher will be trained at the Institute of Microbiology and Parasitology (IMP), Unit for Bacteriology and Mycology (EBM), where will be his primary workplace. The focus of the training will be on determining the resistance of bacteria to antimicrobial drugs, especially in the case of bacteria isolated from various pathological processes in domestic animals and from their living environment. He will also participate in the study of iatrogenic infections, which are becoming more frequent and interesting in veterinary medicine as well. He will focus on studying the properties of coagulase-positive staphylococci, especially the bacterium *Staphylococcus pseudintermedius*, which is part of the normal microbiota of the skin and mucous membranes of healthy carnivores, but in certain circumstances can be one of the more important pathogenic bacteria. The most common problem is pyoderma, which often appears on damaged skin, especially in animals with atopic dermatitis. *S. pseudintermedius* can produce many pathogenicity factors, that are very similar or identical to those described in *S. aureus*, but little is known about the role of these proteins during infection. To initiate infection, *S. pseudintermedius* synthesizes various proteins, such as adhesins, that bind extracellular-matrix molecules and thus promote colonization. Due to the multiplication of bacteria, a mechanism is activated that stimulates the production of exoproteins, such as exfoliative toxins and leukocidins, which promotes the spread of bacteria to other parts of the body and leads to the development of more serious

systemic diseases.

Methicillin-resistant isolates (MRSP) are a particular problem and show a similar resistance pattern to MRSA in humans, and many data also point to their zoonotic significance. Systemic infections with MRSP represent a major problem for the treatment of animals because such isolates are resistant to all beta-lactam antibiotics and, as a rule, also to all other antibiotics registered for use in veterinary medicine. For this reason, it is necessary to develop new treatment strategies and one of them is the use of autovaccines.

The research work of the young researcher will take place at IMP, where he will use various techniques of microbiological examination, with an emphasis on determining the resistance of bacteria to antibiotics using the microdilution method. In addition to classical bacteriological techniques, he will also use more modern methods for the isolation and identification of bacteria (e.g. mass spectrophotometry with the MALDI-TOF) and molecular methods to study pathogenicity and resistance factors, and use the data for diagnostic and epidemiological purposes. He will also participate in the production and study of staphylococcal autovaccines. From the candidate, we expect interest and abilities in scientific research work, fluency in English and willingness for team work. It is also desirable to enjoy working in a microbiology laboratory, where he will conduct most of his investigations.