POSLANSTVO

Ustvarjanje novega znanja s temeljnim raziskovanjami na področju biologije in naj sorodnih naravnoslovnih ved, vendar okolja, biotehnologije ter biomeđicine za razumevanje življenjskih procesov;

prenos ustvarjenega novega znanja v uporabo s ciljem izboljševanja kakovosti življenja;

prenos ustvarjenega znanja na mlajše generacije z izobraževanjem na dodiplomski in poddiplomski ravni.

MISSION

Creating new knowledge through basic research in the field of biology and related natural sciences, environmental protection, biotechnology and biomedical sciences;

Applying newly created knowledge in industry with the goal of improving the quality of life;

Transferring knowledge to younger generations through education at undergraduate and graduate level.
UDVODNI BESEDA
DIREKTORICE

Leto 2015 je zaznamovala 55-letošnica Nacionalnega inštituta za biologijo, predlagali pa so jo podjetnik o razvoju in znanju življenja, ki jo pruža in podpira. Naša metoda je, da izdelek razvijamo iz enega mehankov, ki ljudski organizem od svojega izhodu dana, in izdelamo osebno rješenje, ki ga pružamo.

Leta 1960 prvi pritisn ni bil ena območij, v katerih so laboratorijskih inštitutih ukinili pa pritisk ni bil tako dobro pristojen, kot je bilo mogoče dobiti pa pritisk ni bil tako dobro pristojen, kot je bilo mogoče dobiti.

The year 2015 was marked by the 55th anniversary of the National Institute of Biology. We celebrated the anniversary by presenting the summer's edition of Prof. Uroš Zek, who founded the foundations for this institute.

The year 2015 was certainly not a time of abundance and the research facilities were far from heart that our laboratories and offices house today. Since then the opportunities enjoyed by researchers significantly improved as well, particularly in terms of international cooperation, which was severely restricted at the turn of the tide due to objective circumstances. Nevertheless, it was a time of great creative energy arising from the hope and trust that we, the scientists, are cooperating with society and contributing to the common good. The scenario of the time was of course based on slightly different concepts as at present, yet it collaborated with the state in establishing scientific institutions to solve economic and social problems and to support the developing technologies that enabled the development of Slovenia during the following decades. Today we are closing departments at some of those institutions in fear of the results numbers in annual reports, we are working with our laboratories, turning down our best doctoral researchers and sending them abroad on a one-way ticket.

Have we, the scientists, changed since those days, though we are more successful in researching new ideas than before? Or is it the society that has changed and the policies, power in the wake of local and global financial malappraise and the crises, so they marginalize us and drive us to the very edge of existence? And perhaps even more worryingly, the society rarely recognizes the solutions we provide every day, everywhere, in numerous fields, including biology. But a sensible and deliberate strategy, proper economic and political tools and skills, can utilize these solutions to upgrade the existing ones and create new breakthrough technologies applicable on a global scale. Exploiting this potential would enable relevant branches of economy to leap into the global market.

Slovenija je strinjala prizadevanje, ki je bila potrebna za razvoj in razvijanje znanja. Seveda je bilo mogoče priti k novemu življenju, ki je dali novo življenje in se je uspešno razvijal.

Lesoletje je zahvaljujoči svojim iziskanjem odgovorno in dolgoročno razmisljali tudi s svojo vizijo, da bi bilo mogoče ustvariti nové in nevemnosti ustvarjalnega dela, ki uvrščajo tudi finančni obdelo.

Leto je zahvaljujoči svojim iziskanjem odgovorno in dolgoročno razmisljali tudi s svojo vizijo, da bi bilo mogoče ustvariti nové in nevemnosti ustvarjalnega dela, ki uvrščajo tudi finančni obdelo.

LETO 2015

Presenting his last book "Prelom, do katerega ni prišlo," [The break that did not happen] earlier this year, Dr. Franc Bučar, a great statesman and an admirable person said: "Slovenia must break away from stagnation if it wants to survive!" How? Like Prof. Menajul Zia, who’s defeat was striven with social, financial, professional and personal obstacles, we need to overcome our own, rely on our strengths and change the way we think! Coming to this realisation, we have recently adjusted our focus at NIB and entered into collaboration with over 60 small enterprises and large companies. We have already started to provide the unique value that these companies were seeking for and simultaneously to compensate, is at least in part, for the increasing back of state funding for basic and applicative research. We - the biologists, have recognized how the transfer of ideas, knowledge and skills into biotechnological solutions can significantly improve products or a service - and products with high social value. In doing so, our work has been enriched with new knowledge and we continue to ask difficult questions. All we need to do is to illuminate the problem with the light of a priori knowledge and new definitions of the applicability come into sight. New possibilities arise for creative work - such that can also create profit.

The works of this year’s winners of the Miramar Zia award are marked by this sort of broad thinking and action - they already transfer their knowledges into business-oriented organizations. Researchers of this sort are also among us at NIB and we hope their examples will be followed by many younger colleagues – the doctoral researchers.

At a recent opening of the third meeting of Europlid in the EU Parliament, Carlo Incerti, the vice president of the Greens group, said: "No other sector holds the promise to enhance quality of life, productivity and environmental sustainability through innovation like biotechnology, while also benefitting Europe's economy and research base!" - enriching our knowledge about the basic policies out of government. There is nothing to add to this statement.

prof. dr. Tamara Lah Turnšek

DIREKTOR

Prof. Dr. Tamara Lah Turnšek
DIREKTOR
VODSTVO INŠTITUTA / INSTITUTE’S MANAGEMENT

DIREKTORICA / DIRECTOR
prof. dr. Tamara Lah Turnšek (od/ from 1996)

POMOČNIK DIREKTORICE / ASSISTANT DIRECTOR
mag. Franc Potoknik (od/ from 1996)

UPRAVNI ODBOR / BOARD OF GOVERNORS
Mandat/ Mandate: 28. 5. 2014 - 28. 5. 2018
Ivana Erjavec
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dr. Matjaž Owen, Lek d.d.
prof. dr. Marina Dermaščič
NIB – podpredsednica / vice-president
Luka Živčič, MSc

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doc. dr. Andreja Ramljak
Iz. prof. dr. Jana Zel

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dr. Day Van Den Eede, od/ from 23. 10. 2010
prof. dr. Cornelis Johannes Ferredin van Heezen, od/ from 14. 11. 2014

Organizacijska shema
Organizational Scheme

Nacionalni Institut za biologijo
National Institute of Biology

Upravni odbor
Board of Governors

Director
Pom. director

Skupne službe
Corporate Services

Glavna pisarna
Main Office

Področje za zunanje zadove
General and Legal Affairs

Pisarna za prihod tehnologijo
Technology Transfer Office

Finančne in računovodstvene
Finance and Accounting

Biološka knjižnica
The Biology Library

Znanstveno-raziskovalne organizacijske enote
Research Units

Nord biološka postaja Prirodnih recirkulacijskih
Marine Biological Station

Infranščinski center POP
POP Infrastructure Centre

Ozadje za biotehnologijo
Department of Biotechnology

Infranščinski center Planeta
Planeta Infrastructure Centre

Ozadje za raziskovanje sladkovodnih
Inshore Exsitionary

Ozadje za entomologijo
Department of Entomology

Ozadje za genetiko tehnologijo
Department of Genetic Technology

Ozadje za ekosistemske raziskave
Department of Ecosystem Research
2015 BUSINESS REPORT - OVERVIEW

In 2015 the NIB created an income of 6,169,099 EUR and an outcome of 6,141,138 EUR. The profit thus amounted to 27,961 EUR before business tax and 24,387 EUR after tax.

In comparison to that of 2014, the NIB business year 2015 was marked by a significant reduction of income amounting to 616,478 EUR or 9.00%. This resulted instaff reductions - termination of work contracts with 10 employees.

The most significant income reduction occurred in the area of EU project funding including the 7th EU Framework Programme or Horizon 2020, various INTERREG programmes, LIFE+, ERA-NET and EPR programmes etc. In this particular category the income in 2015 was 433.151 EUR or 36.73% lower than that of 2014. The reduction resulted from the completion of several projects funded by the programmes listed above. Simultaneously, the opportunities to attract new project funds from EU programmes were severely limited, which was partly due to a one-year gap in publishing calls for applications (most substitution), and partly a result of greatly increased competition affecting the success rate of project proposals.

Minding every effort to preserve the human resources, the NIB's most important asset, to a maximum extent in the financial circumstances of 2015, NIB was bound to operate in an extremely economical and efficient way.

In 2015, the NIB was successful at attracting project funding from the Slovenian Research Agency. Five (5) projects with the NIB as project coordinator were endorsed and a further four (4) where the NIB cooperated as partner organisation. Intensive efforts were devoted to submitting project proposals in the scope of Horizon 2020 and other EU financing schemes. The successful applications include one (1) project in the scope of Horizon 2020, one (1) from such, EMPIR and ERA-NET programmes and a further one (1) project in the scope of EMODNET network. All projects except the one financed by Horizon 2020 will commence in 2016.

In 2015, the NIB continued its initiatives in EU programmes: LIFE, ERA-NET, EPR and INTERREG. In total, the NIB received 433,151 EUR from EU programmes.

The NIB's financial report for 2015 shows a decrease in income and outcome compared to 2014. The income decreased by 24.387 EUR, while the outcome decreased by 27,961 EUR.

The NIB is planning to focus on increasing its income and outcome in the future by participating in EU programmes and attracting new project funds.

The NIB continues to collaborate with the Slovenian Research Agency and other organizations to receive funding for its projects.

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IZVAJANJE RAZISKOVALNIH PROGRAMOV IN PROJEKTOV V LETU 2015

Kot nosilec je NBi leta 2015 izvajal naslednje raziskovalne programe:

- P1-3927 - Bazahnova skladna rastlina, ki poteka v organizacijski entiti MBi (7.78 FTE), obdobje financiranja 2015–2018;
- P4-0185 - Biotehnologija in slamezna biologija razmika, ki poteka v organizacijski entiti FTd (4.7 FTE), obdobje financiranja 2016–2020;
- P1-0299 - Zdravila, zdravstvene in izobraževanje v okolju, ki poteka v organizacijski entiti EKO in ENITOMO (8.69 FTE) ter v družbenih organizacijah Prirodovrsnega muzeja Ljubljana (0.1 FTE), obdobje financiranja 2016–2016;
- P1-0243 - Biotehnologija, teksilnolola in generacija in korisne znanosti, ki se izvaja v organizacijski entiti GEN (0.35 FTE), obdobje financiranja 2015–2018.


V primerjavi z letom 2014 je bil obseg financiranja raziskovalnih programov leta 2015 več za 0.02 %.

NBi je leta 2015 izvajal tudi infrastrukturni programe v obsegu 6.9 FTE.

NBi je leta 2015 izvajal 13 projektov ARRS v skupinem obsegu 12.386 raziskovalnih in 12.664 raziskovalnih, in skupaj:
- 5 teoretičnih (1 iznosniček);
- 6 aplikativnih (1 iznosniček);
- 1 podstrelnični projekt in
- 1 projekt, financiran po komplementarni shemi (1 iznosniček).

RESEARCH PROGRAMMES AND PROJECTS IN 2015

In 215 the NBi acted as coordinator of the following research programmes:

- P1-3927 - «Coastal sea research» (7.78 FTE), carried out in MBi organization unit, duration 2015–2018;
- P4-0185 - «Biotehnologija in system biology of plants» (4.7 FTE), carried out in FTd organization unit, duration 2016–2020;
- P1-0299 - «Chemicals, reagents and communications in the ecosystems» (8.69 FTE), carried out in EKO and ENITOMO organization units in cooperation with Natural History Museum of Slovenia (0.1 FTE), duration 2015–2016;
- P1-0243 - «Biotehnologija, teksilnolola in generacija in korisne znanosti» (0.35 FTE), carried out in GEN organization unit, duration 2015–2018.

In addition to the four programmes listed above, NBi has acted as partner in P1-8148 «Spaying of substances in the environment, assimilation, modelling of environmental processes and risk assessment» programme with Pufle Jakob Institute as coordinator and the NBi as partner organisation with 0.32 FTE.

In comparison to 2014, the extent of financing of research programmes increased per 0.02%.

In addition, an infrastructure programme (6 FTE) was carried out at the NBi in 2015.

In 2015, 13 projects funded by the Slovenian Research Agency were carried out at the NBi, with research time amounting in total to 12,369 working hours in the scope of:
- five (5) basic research projects (one (1) as coordinator);
- six (6) applied research projects (one (1) as coordinator);
- one (1) postdoctoral project;
- one (1) project co-financed in an ERC Complementary Scheme (as coordinator).
Obseg projekтов, ki jih je financiral ARRS, je bil leta 2015 za 13.66% manjši v poročnem periodu.

NIJ je leta 2015 izvajal 4 projekta v skupni CIP-Zagrebu, si hrano za življenje v vrednosti 30.535 EUR, in sicer:

- 1 kot nosilec in
- 3 kot sodelujoča raziskovalna organizacija.

Obseg projekтов CIP se je p o obsegu sredstev leta 2015 v tem periodu podal osebje 21 v francoski sosednje državi za 2.76 EUR.

Leta 2015 je ARRS izvajal 7 projektov v obliki programov 3U in programov CIP. V zvezi s programom CIP, ki je obsegel: 4,1 po 1, je z ostalim izasedal. Vrednost ustvarljivih rezultatov pod taki priložnosti je značila 272.144 EUR, kar pomeni 4.4% vsih sredstev, ki so jih podalo po CIP.

Leta 2015 je ARRS izvajal 10 projekttov iz drugih mednarodnih sredstev financiranja (InterREG, ERANET, EUREAMET, LIFE+) in drugih). Vrednost ustvarljivih prihodkov s temi projektji je bila 473.960 EUR in je pomenila 7.68% vsih prihodkov.

In 2015 the financing of the NIH projects by the Slovenian Research Agency was 13.66% lower in comparison to the previous year.

Four (4) projects in the scope of the target research project "Ensuring food for tomorrow", with total funds amounting to 30,535 EUR, were carried out at the NIH in 2015. In one (1) NIH acted as coordinator and in three (3) as participating research organizations.

The scale of financing from target research projects was 22.98% lower in comparison to that in the previous year.

In 2015 the NIH carried out eight (8) projects in the scope of the EU 7th Framework Programme and Horizon 2020; 2015 was the concluding year for four (4) of those projects and one (1) had started. The income from this segment amounted to 272,144 EUR and represented 4.4% of total NIH yearly income.

Ten (10) NIH projects were financed by other International funding schemes (INTERREG, ERANET, EUREAMET, LIFE+ etc.). The income from this segment amounted to 473,960 EUR and represented 7.68% of total NIH yearly income.

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**INVESTICIJE V LETU 2015**

Leta 2015 je institut realiziral investicijska vlaganja v vrednosti 861.585,02 EUR, od tega z lastnimi sredstvi za 334.371,77 EUR in s sodelovanjem za 527.214,15 EUR. Pretresni del investicij je bilo financiran z gradnjo raziskovalnega rastlinskih v vrednosti 486.714 EUR, in sicer 53% iz sredstev Evropskega sklada za regionalni razvoj in 15% iz sredstev Republike Slovenije.

Med novimi pridobivanimi raziskovalnimi opremi veljave vrednosti so predvsem:

- aparat za avtomatizirano pripravo in analizo kapilarnih digitalnih verjetnosti in reakcij s polimerami (diPCR),
- aparatura za razgledovanje molekulnih interakcij na podlagi površinske plazmonski rezonanci,
- HF-radio transmisor za Roy of Pion (WERA).

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**INVESTMENTS IN 2015**

In 2015 the NIH invested a total of 861,585.02 EUR, out of which 334,371.77 EUR originated from internal funds and 527,214.15 EUR were provided through co-funding. The main significant proportion of co-financing funds was used to build a research greenhouse, the construction of which cost 486,714 EUR—of which 53% was provided by the European Regional Development Fund and 15% by the Republic of Slovenia.

Major investments into research equipment, newly acquired in 2015, include:

- automated system for sample manipulation and droplet digital polymerase chain reaction (diPCR),
- surface plasmon resonance-based system for measuring molecular interactions,
- HF-radio transmitter for Roy of Pion (WERA).
Institut je bil leta 2015 sestavljen iz petih raziskovalnih odvjetnic in Beskrajnih služb. Zaposlenih v teh četrteh odvjetnicah je bilo 63% vsih zaposlenih na NIB. Oddelki za biotehnologijo in sistematiko in evolucijo (ITTO) je zaposlilo 37 sodolovcev, entomologorija Merna biotopika Postojna (MNP) pa 34. Preostale osebe sodijo med 11% zaposlenih, ki so delovali na raziskovalno-skupinskega in kopornega eksanatomija (EKO) 11. Oddelki za genetiko tekovalni in biološko raku (GEN) 13 sodolovcev. Oddelki za entomologijo (ENTOMO) 7, skupne službe (SS) pa 16 sodolovcev.

Na NIB je bilo tako 118 zaposlenih na dan 31. 12. 2015, od tega 61 raziskovalcev, 18 mladih raziskovalcev, 22 strokovno-tehničnih sodolovcev in 18 administrativnih sodolovcev.

Leta 2015 se je na novo zaposlilo 9 sodolovcev, 20 pa je delovno razmerje na NIB prenehalo.

The NIB consists of 5 research departments and Joint Services. In 2015, the staff of the two largest departments, Department of Biotechnology and Systems Biology (ITTO) with 37 employees and Piran Marine Biology Station (PMBSS) with 34 employees, represented 60% of all the NIB employees. Other, smaller departments including Department of Freshwater and Terrestrial Ecosystems Research (EKO), Department of Genetic Toxicology and Cancer Biology (GEN), Department of Entomology (ENTOMO) and Joint Services had 11, 13, seven (7) and 16 employees respectively.

On 12 December 2015 NIB had 118 employees: 61 researchers, 18 early-stage researchers, 22 technicians and 18 administrative staff.

In 2015 six (6) employees were newly hired and 20 had finished their career at the Institute. Five (5) early-stage researchers finished their PhDs and three (3) early-stage researchers started their training.

On 31 December 2015, 59 employees had a PhD, six (6) had a MS, 41 higher education, three (3) higher vocational education and nine (9) had finished high school.
### DOCTORAL DISSERTATIONS, MASTER'S THESSES AND UNDERGRADUATE THESSES IN 2015

Doctoral dissertations under the (co)supervision of NIB researchers in 2015:

<table>
<thead>
<tr>
<th>STUDENT / STUDENT</th>
<th>MENTOR: SOMENTOR (SUPERVISOR, CO-SUPERVISOR)</th>
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<tbody>
<tr>
<td>Bias, Marjana</td>
<td>prof. dr. Kristina Gruden</td>
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<td>Cigoj, Maja</td>
<td>izc. prof. dr. Maruša Pompe Novak, (izc. prof. dr. Paolo Silvotti)</td>
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<td>Erjavec, Jana (NIB)</td>
<td>izc. prof. dr. Maja Ramnikar</td>
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<td>Nerman, Ana</td>
<td>dr. Matjaž Jeras; (prof. dr. Kristina Ljubetic)</td>
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<td>doc. dr. Meta Virant-Obverlet</td>
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<td>Puleša, Ana</td>
<td>prof. dr. Lea Dejančar, (doc. dr. Božica Žegura)</td>
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<td>Račič, Nejc (NIB)</td>
<td>izc. prof. dr. Maja Ramnikar, (dr. Ivan Gillerot-Agurme)</td>
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<tr>
<td>Ramšak, Živa (NIB)</td>
<td>prof. dr. Kristina Gruden</td>
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</tbody>
</table>

### Number of Undergraduate Theses, Master's Theses and Doctoral Dissertations under (co)supervision of NIB researchers in years 2006-2015:

- Magisterka nalog / Master's Thesis: 1
- Doktorska disertacija / Doctoral Dissertation: 4
- Mentor pri doktorskih disertacijah / Supervisor for Doctoral Dissertations: 9
- Mentor pri magistrskih delih / Supervisor for Master's Thesis: 13
- Mentor pri diplomskih delih / Supervisor for Undergraduate Theses: 14
- Somentrator pri doktorskih disertacijah / Co-Supervisor for Doctoral Dissertations: 4
- Somentor pri magistrskih delih / Co-Supervisor for Master's Thesis: 7
- Mentor pri diplomskih delih / Co-Supervisor for Undergraduate Theses: 1
ČLANKI, OBJAVLJENI V REVIJAH Z NAJVEČJIM FAKTORjem VPLIVA
ARTICLES PUBLISHED IN JOURNALS WITH THE HIGHEST IMPACT FACTOR

VERBOVŠEK, Urška, NOORDEN, Cornelia J. F. van, LAI TURBESTI, Tamara.
Complexity of cancer proteome biology: cathelic K expression and function in
vol. 35, str. 71-94. [COBISS.SI-ID 30514913]
IF (JCR) = 9,836

MODAHL, Helina, KRENCH, Ana, GRUĐEN, Klemen, NAVARDO, Dua, KRESIČ, Christian, LAI TURBESTI, Tamara.
Human immunogenicity of cross-talk primed phenotype alterations and
vol. 4, no. 38, str. 4089-4107. [COBISS.SI-ID 30534741]
IF (JCR) = 8,281

TIPK, Tinka, VUČOVA, Jana, MARZENČ, Paulina, TVACERŠEK, Ana, RADOVNIČ, Matjaž, MERTL, MALFATNA, Francesca, TURK, Valentina.
Bacterial community shift is induced by dynamic environmental parameters in a
trading coastal ecosystem (Northern Adriatic, northeastern Mediterranean Sea) -
IF (JCR) = 6,301

DOBNIK, David, RPTIČ, Gregor, KREČMAR, Jurij, NIKSNIKOLOVIĆ, Bojan, NOJER, Tim, JELN, Ana.
Multiplex quantification of 12 European Union-authorized genetically modified maize
lines with droplet digital polymerase chain reaction. Analytical chemistry, ISBN 0022-
IF (JCR) = 8,204

ŠTAR, Alenka, KULSEAR, Aran, PAVLOVIČ, David, KOVČEK, Cvetka, TUHČANIMIČ, Magda, LEMAROD, Matjaž, ZABLAN, Ana.
Size characterization and quantification of exosomes by asymmetrical-flow field
vol. 87, iss. 16, str. 7925-7933. [COBISS.SI-ID 31541382]
IF (JCR) = 9,836

KOVČE, Rihard, CSMIČ, Petar, SREBAR, Tomaz, ZUGNICK, Anja, KREČMAR, Jurij, NOJER, Tim, JELN, Ana, RADOVNIČ, Matjaž, MERTL, MALFATNA, Francesca, TURK, Valentina.
Assessment of toxicity and genotoxicity of low doses of S-flurourine in zebrafish
[COBISS.SI-ID 32130999]
IF (JCR) = 5,985

KUBIK, Darja, RUPAR, Matevž, GUZEREL, Irena, CURZ, Tomaz, BORZAR, Alen, RADOVNIČ, Matjaž, MERTL, MALFATNA, Francesca, TURK, Valentina.
Deep sequencing of virus circovirus small interfering RNAs and RNA from viral particles
shows highly similar mutualistic landscape of a plant virus population. Journal of virology,
IF (JCR) = 4,438

KLAPC, Marko, KOŠIC, Gregor, ŠAJS, Matjaž, Kolesarič, Žaneta, PETKOVŠEK, Brežice, Rates of the coelomocyte CO metabolism and medullate homogones in
astele insect and immunosuppression in immunosuppressive xenobiotics in
vol. 14, no. 104, str. 1-12. [COBISS.SI-ID 43234226]
IF (JCR) = 4,221

RAČ, Mate, TRUBETV, Samuel, KOP, Štjepan, KOMAR, Petra, ŽEVIČ, Tomaz, KERN, Peter, ŽEVIČ, Tomaz.
Risk assessment of metals and PAHs for receptor organisms in differently polluted
vol. 502, str. 404-414. [COBISS.SI-ID 32110783]
IF (JCR) = 4,039

Poročilo o delu 2015 Annual report 2015
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*Prinadrežni zmenki in nekaterih zbornikih NIB so v redni vrstici.*
*Papers are counted according to affiliation of the first author.*
ACHIEVEMENTS, AWARDS AND ACKNOWLEDGMENTS IN 2015

ZCIS AWARD
Juljebus, 19 November 2015

ZCIS Award was presented to the scientific research team in the field of environmental and plant biology for the project titled "A study of the genetic diversity of wild species within the plant kingdom and the assessment of their biotechnological potential." The research team, led by Dr. Janez Senovžek, has made significant contributions to the field of biotechnology and has been recognized for their outstanding work.

GRAND MIROSLAV ZEJL LIFETIME ACHIEVEMENT AWARD
Juljebus, 12 November 2015

The Grand Miroslav Zel Lifetime Achievement Award was presented to Dr. Milan Šimunic for his outstanding contributions to the field of environmental and plant biology.

MIROSLAV ZEL SPECIAL ACHIEVEMENTS AWARD
Juljebus, 19 December 2015

The Miroslav Zel Special Achievements Award was presented to Dr. Tadej Kavčič for his significant contributions to the field of environmental and plant biology.

NAGRADE ZA PROŽEJALNO DELO NA PODROČJU VIBRACIJSKE KOMUNIKACIJE
Pozneje, 1. 3. 2016

Professor Dr. Janez Senovžek received the Award for his outstanding contributions to the field of vibrational communication in insects.

OUTSTANDING DOCTORAL DISSERTATION AWARD
Juljebus, 12 November 2015

Dr. Klemen Škrt received the Outstanding Doctoral Dissertation Award for his work on the topic of "Environmental and plant biology."
LAPAJNE PLAQUE
Portorož, 17 September 2015
Prof. Dr. Marina Dermastia je prejela Lapajne Plačko za zaslugi pri učinkovanju slovenske biotehnikarstvene in molekularne biologije na področju varstva rastlin v Sloveniji. "Na podlagi svoje dela...".

SILVER BADGE FOR SPECIAL ACHIEVEMENTS IN THE FIELD OF PLANT CONSERVATION
Ljubljana, 3 March 2015
The Society for Plant Conservation awarded the Silver Badge to prof. Dr. Saj Suvak. "She acknowledges her efforts...".

RESEARCH GREENHOUSE OPENING
Ljubljana, 18 November 2015
In November 2015, currency was held at the opening of the research greenhouse at NIB. "New acquisition provides...".

IZUMI IN INOVACIJE

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TRANSFER OF KNOWLEDGE TO THE INDUSTRY

The marketing of the NIB products and services is managed by the NIB Technology Transfer Office (TTD) established in 2010. In the field of technology transfer, the NIB also collaborates with TTOs at the Jožef Stefan Institute, National Institute of Chemistry, University of Ljubljana, University of Maribor and University of Primorska. In 2015 the latter published a brochure entitled Technology Transfer at public research organisations in Slovenia. Transfer of knowledge and technologies at the NIB is most intensive in the field of health and food safety, particularly in the field of modern techniques in high-efficiency molecular technologies for determination and quantification of DNA in biological samples, in the field of substance research, and clinical studies, where the NIB knowledge is applied in new cancer therapies.

[Z bacterijskim džetom, boljša zveza / Plant infected with bacteria]
CORPORATE SERVICES

Corporate Services perform some individual business functions such as finances and accounting, managing human resources, purchase procurement, general secretariat, managing the information system, support to governing bodies of the NIB and similar activities. They are also in charge of providing support to research departments, mainly administration support for project management and support to knowledge and technology transfer.

The Library, part of the Corporate Services is managed jointly by the National Institute of Biology and the Biology Department of the Biotechnical Faculty, University of Ljubljana.
MORSKA BIOLOŠKA POSTAJA PIRAN

SPREMLJAVANJ IN OZDOBOVANJ MORSKIH EKOŠYSTEMOV

Vodje: doc. dr. Vladko Mladič;
Raziskovalni delavnici: dr. Janez Logaj

Leta 2013 je Morsko biologija osnovne (MBP) bila vključena med naslovne projekte in skupnosti za raziskovalne programi in vedno raziskovalnike in dejanje opuščenih projekti. Raziskovalna vključena v skupni program raziskovanj, razvoja in utemeljenja raziskovalnih programov, ki dajejo raziskovalcem možnost za izvedbo svojih projektnih posameznih projekti. Vključena v raziskovalne program, raziskovalce in delavnike ter inzistencij, ki dajejo raziskovalcem možnost za izvedbo svojih projektnih posameznih projekti.

Raziskovalni program P1-4237 Raziskovalna območja ter. V nadomestni izvrdni izvira iz vključenja v skupni program raziskovalnikov, ki dajejo raziskovalcem možnost za izvedbo svojih projektnih posameznih projekti. Vključena v raziskovalne program, raziskovalce in delavnike ter inzistencij, ki dajejo raziskovalcem možnost za izvedbo svojih projektnih posameznih projekti.


PIRAN MARINE BIOLOGY STATION

VARIABILITY AND RESILIENCE OF MARINE ECOSYSTEMS

Vodja: doc. dr. Vladko Mladič;
Raziskovalni delavniki: dr. Janez Logaj

Piran Marine Biological Station is a leading Slovenian unit for marine ecosystem research. In 2013, coastal and marine research was carried out in the scope of two research programmes and several national and international research projects. Research performed within these programmes produced new knowledge on coastal marine ecosystems and organisms, so as to contribute to the conservation of many larvae species at different spatial and temporal scales.

The research programme P1-4237, "Central Marine Research", in cooperation with the Slovenian Forestry Agency and foreign researchers, has taken advantage of the Adriatic Sea circulation model and the Mediterranean Sea circulation model, which have proven more accurate at predicting sea-water mixing during a period of oceanic events. This model, with an analysis of jellyfish dispersion in the Mediterranean Sea using data from 2015, has been the first to a species population model of jellyfish. Results from three years of data collection show jellyfish dispersion from Italian and Turkish habitats and their interaction with others.

The moon jellyfish is a gelatinous animal and no important for the Adriatic Sea. In a coastal laboratory environment it has been observed that the species is able to divide and reproduce in marine microhabitats by using allometric forms of reproduction. In our research we have measured the composition of body mass in moon jellyfish, which differs from that in the surrounding water, and confirmed our research hypothesis on the origin of ocean jellyfish. We have also measured the concentration of dissolved organic matter, which will be presented in the following analysis.

Morska biologija osnovne (MBP) je bila vključena med naslovne projekte in skupnosti za raziskovalne programi in vedno raziskovalnike za raziskovalne programi, ki dajejo raziskovalcem možnost za izvedbo svojih projektnih posameznih projekti. Vključena v raziskovalne program, raziskovalce in delavnike ter inzistencij, ki dajejo raziskovalcem možnost za izvedbo svojih projektnih posameznih projekti.


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In 2015 we also performed a phylogenetic analysis of photosynthetic symbionts in some species of jellyfish collected in the Mediterranean Sea and the Atlantic Ocean, using nuclear ribosomal genes of symbionts. Analyses show that symbiont identity is not specific to a particular jellyfish developmental stage, but rather determined by the host. We completed the phylogenetic analysis of the Pelagia and described a new genus of the family on the basis of morphological and genetic characters. We analysed mtDNA and nuclear rRNA genes.

In cooperation with partners working on the PERSUS project we have prepared a phylogeographic analysis of jellyfish in different coastal regions of the Mediterranean Sea. We published a review article presenting the jellyfish of the Mediterranean Sea, occurrence of jellyfish species and the ecological role of jellyfish in the pelagial.

In this scope of the BALMAS project we continued to identify organisms from various zoological groups (plankton, benthos, nekton) including Tissue Developmental stages (e.g., dipleoplagula cysts). Cooperating with Cesareo from Creta we published on the first description of Pseudodiplothrix marina, an allochthonous planktonic copepod, in the Port of Creta. This was the third noted occurrence of the species in the Adriatic and the fourth in the Mediterranean. We published our results developing methodologies for fast quantification of living planktonic organisms contained in ballast waters.

Research on plankton and benthos ecology and biodiversity provides basic support for environmental policies, particularly in line of developing biological indices to assess the ecological and environmental status in accordance with EU directives (2000/60/ES and 2008/66/ES). In 2015 we finalized and unified the methodology for evaluating the ecological state of Atlantic coastal waters of using phytoplankton. We completed our work developing a methodology for assessing the status of coastal marine seagrass meadows of Cymodocea nodosa and published the results, including the introduction of a new index (Medseaweed), in the journal Marine environmental research.

In the scope of the trans-border cooperation project TRECORDA we prepared bilingual web-boards on biogenic formations. In cooperation with researchers from Croatia we sampled the ichthyology of the Large Lake in the National Park on the Island Mljet and concluded our comparison of North and South Adriatic populations of stony coral. We studied the feeding habits of Myllobatis aquila, Pteromyauous

Poročilo o delu 2015 Annual report 2015
onosnâlji, ki modulirajo encime okoliškega stresa in učinek organizovalnih postopkov v morju. Z institutom za biologijo morja v Koperu (Cnina gong) smo analizirali kumulativno učinek onošenâlja v Goriščakem zalivu.

Leta 2015 smo raziskovali hipersolno okolje v Sočevskih solinah s stalično mobilnostjo težkih kovin v sistem u solinsko blato (brina fazla/solanka). (Elektro fazla), kar je ključno za praktično uporabo lonšnega substrata kot zdravilo blato.

Glavni dosežki v letu 2015

Znanostno raziskovalni svet za naravoslovne vede je delo Bacterial community shift is induced by dynamic environmental parameters and in changing coastal ecosystems (northern Adriatic, NE Mediterranean Sea) - a 2-year time series study, published in the journal Environmental Microbiology, was featured in the Excellent in Science in 2015 selection picked out by the Scientific Research Committee at the Slovenian Research Agency. The Slovenian Research Agency and the SATENA society organised a public presentation of their scientific achievements on December 2 2015 in the Café of the Grand Hotel Union entitled Excellent in Science. In the scope of the action "Science on the street, knowledge and ideas on the go". At the event, Dr. Tinkina Tintat presented her work, which is based on the collaboration between Slovenian and foreign researchers active in various expert fields. In association with the Slovenian Press Agency, she recorded a film about her work in research.

In 2015, the setup of HF radar monitoring system of surface currents and waves in the Trieste and Roper Bay was completed in the scope of the HADIP2 project (IAT Adriatic). Setting up a trans-border system of new measuring infrastructure in the Trieste Bay enhanced the efficiency of action in case of accidents and spillage of oil or toxic substances at sea, which is important for the safety of Installations involved in marine interventions. The current and past results of these measurements are available on the total web-page (http://www.nib.si/mrb/apps/wera.rsst).

Between September 28 and October 3 2015, the 2nd symposium on environmental biogeochemistry took place in Piran (http://www.sae2012ajs.si). It was organised by the Department of Environmental Sciences at US in association with PMBS NIB. The main purpose of the symposium was to disseminate knowledge and exchange experiences within the field of interdisciplinary biogeochemical research.

Main Achievements in 2015

The article - "Bacterial community shift is induced by dynamic environmental parameters and in changing coastal ecosystems (northern Adriatic, NE Mediterranean Sea) - a 2-year time series study", published in the journal Environmental Microbiology, was featured in the Excellent in Science in 2015 selection picked out by the Scientific Research Committee at the Slovenian Research Agency. The Slovenian Research Agency and the SATENA society organised a public presentation of their scientific achievements on December 2 2015 in the Café of the Grand Hotel Union entitled Excellent in Science. In the scope of the action "Science on the street, knowledge and ideas on the go". At the event, Dr. Tinkina Tintat presented her work, which is based on the collaboration between Slovenian and foreign researchers active in various expert fields. In association with the Slovenian Press Agency, she recorded a film about her work in research.

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Anija

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DEPARTMENT OF FRESHWATER AND TERRESTRIAL ECOSYSTEMS RESEARCH

PRISTINE NATURAL ECOSYSTEMS ARE OUR ASSET

Head: Ass. Prof. Dr. Nele Vinko-Cicelj, Ph.D.

Basic and applied research activities at the Department of Freshwater and Terrestrial Ecosystems Research are focused on environmental processes.

Our research includes:

- monitoring environmental conditions and composition of core taxa, investigating impact of hydrological and biotrophic conditions on composition of taxa in water springs in series;
- studying geographical range from horizons at springs of the spring, determining water and mineralized sources;
- investigating impact of climate on other ecosystems;
- seeking ecotrophic strategies to deteriorate the adaptability of aquatic species to changes in various environmental factors;
- research on relations between biota and water spalaneous substrates and reconstituted niches;
- studies of bacterial species isolated in the SO Habitat Collection;
- studies of human interaction with the environment in freshwater and urban areas.

Important milestones in 2015

- We published a paper that significantly increased our understanding of trout climate change (measuring and changes in the hydrological regime) and newly released findings on changing and corresponding effects of global climate on the Journal of Freshwater Ecology Process. Eppm tested the high sensitivity of metapopulation of insects in response to changes in temperature and hydrological regime.
- We presented the results of interdisciplinary research, assessing the potential of groundwater indicators during baseline remote sensing and spatiotemporal monitoring of pristine freshwater environments.

Imaging results from the current year focused on the essential process for distinguishing between the pristine, aquatic and variable status of various aquatic ecosystems.
Raziskovali smo vire težav, ki delujejo za evolucijo vibracij pomunin. Obsegli smo članek in v njem pokazali, da je postopanje vibracijih signalov energije zahoteno in da je osnovno vibracijalno zdravilo izgubljeno v življenju duhovniškega učenja.

Analizirali smo vsega in splošno spodbudil femoro-pelvsko korekcijo, kar omogoča razvoj novih pristopov za monitoring te osebnih in zanesljivih vesoljskih odstankov.

Za srečne korekcije in vzpostavljenih polníc smo organizirali strokovni panel, ki je vsebuje natančno podrobnost o pravilnikih operacije, izdelana pa sta ga tudi minister za izobraževanje, vzgojo in prehrano RS ter direktor Kmešljansko-poškozalni zborove.

**BIBLIOGRAPHIA / BIBLIOGRAPHY**

1. Izvorni znanstven článok / Original Scientific Article
2. Pojednostavljen článok / Popular Article
3. Objavljeni ponosni prizvrsni prispovec na konferenci / Published Scientific Conference Contribution Abstract
4. Rezultati, bralne izvleke, kritika / Review, Book Reviews, Critiquet
5. Incertus / Interview
6. Magistralska dela / Master's Thesis
7. Druge monografije in druga zaključena dela / Other Monographs and Other Completed Works
8. Raziskovanji ali TV dogodek / Radio or Television Event
10. Druge izvedene dela / Other Performed Works
11. Uvedbino / Edutainment

We organized a meeting between bees and wild bees – overexploited pollinators targeting policy and decision makers in the field of agriculture and environment.
DEPARTMENT OF BIOTECHNOLOGY AND SYSTEMS BIOLOGY

FROM VIRUSES TO PLANTS AND BEYOND

Hans R. Auxen, Prof. Dr. Ing. Pavletar

špekulacije

- generating knowledge concerning biological processes of the biological sciences quality and its application to identification of relationships between plant and animal organisms using quantitative and qualitative molecular biology and developing systems biology approach;
- gaining insight into the functional genomics biology in order to understand their diversity, pathology and epidemiology in the context of developments better approaches their control and treatment;
- developing new methodological approaches to biotechnology for more effective identification and association of disease in agriculture of their adoption on the world market in the coming years;
- upgradation the technological platforms to support system biology research as well as technologically oriented research of target organisms;
- transferring newly created knowledge concerning biology of pathogenesis and genetically modified organisms along with new methods for their identification to the field of agriculture, pharmacy, medicine and environment conservation; (The Department isolates two official diagnostic laboratories for determination of GMO and pathogen replication);”

sustainable complementary sustainable partnership with other research groups in the EU, in analysed, Europe and the world, leading to new discoveries in science;

sustainable partnerships with governmental and European organisations, academic institutions and industry, working together to solve global problems related to our field of expertise;

partnerships with private, research and academic institutions, NGOs and experts in the area of innovation and development to facilitate the adoption of new technologies and services.

49
**Important achievements in 2015**

RNA viruses exist within a host as a population of mutant sequences, often referred to as a quasispecies. Within a host, sequences of RNA viruses constitute several distinct, but interconnected pools. We published the most comprehensive whole-genome characterization of a within-host virus population to date and the first study comparing diversity of different pools of virus sequences within a host, obtained by using ultra-deep Illumina sequencing in the Journal of Virology (IF 4.438). Comparing two virus sequence evolution trajectories, we demonstrated that RNA from purified viral particles has the same potential for detection of recombinant viral genome segments as pollution of complete consensus virus genome sequence as small interfering RNA (siRNA) study with an important baseline for future studies of virus population dynamics. For example, showing that the population from a new host and developed from non-pathogenic virus strains.

**Kralja predstavnikov majhen**

**rekonstrukcija genome PVV z dvena tehtel vonatvša in podatkovna**

Circular representation of mutations in recombinants genome PVV within the PVV genome with two approaches and the alignment of virus sequences.

We continued our research on interactions between potato virus PVY and potato cultivars, which are susceptible, tolerant or resistant to the virus. We defined the mechanisms underlying tolerant responses of potato to infection in a study published in BMC Genomics. We focused on the dynamics of primary metabolism-related processes during infection at the level of transcriptomics analysis, non-targeted proteomics, and photosynthetic activity in potato ox. Oxidative and its inorganic counterpart is crucial for identification of salicylic acid. We suggested that detected induction of light reaction components in the early stages of infection is possibly associated with tolerance of the investigated cultivar to virus infection.

As the number of GMOs has increased over time, standard qPCR analyses are no longer sufficiently cost-effective. On the basis of droplet digital PCR technology (ddPCR), two multiplex assays for quantification of 12 genetically modified maize lines (1 April 2015) were developed. It showed that both multiplex assays produce specific results and that platforms' parameters such as limit of quantification, repeatability, and trueness comply with international recommendations for GMO quantification methods. Moreover, for samples containing GMOs, the throughput and cost-effectiveness is significantly improved in comparison to qPCR. Thus, it was concluded that in case of new authorizations, events can easily be added to existing multiplex assays. The presented principle of quantitative multiplexing, published in the Journal Analytical Chemistry with an impact factor of 5.836, can be applied to any other domain.

**Poročilo o dela 2015 Annual report 2015**
Residues of anti-neoplastic drugs represent new and emerging group of pollutants in aquatic environments. Many of these drugs are genotoxic, and it can be postulated that they can cause adverse effects in aquatic ecosystems. In a panel research of FTO and the Department of Genetic Toxicology and Cancer Biology the effects of low doses of 5-Fluorouracil on zebrafish (Danio rerio) were studied at the survival, reproduction and transgeneration level. The results were published in Water Research journal with the impact factor of 5.991. Although chronic exposure of zebrafish to environmentally relevant concentrations of 5-FU did not affect their reproduction, it can be suggested that 5-FU can lead to degenerative changes, including cancers, which might affect fish populations over long-term exposure of several generations.

Leta 2015 smo izvedli različne domače in mednarodne izobraževalne delavnice za uradne veterinarje in inženjere za hrano pri Urada za varno hrano, veterinarstvo in varstvo rastlin, v sklopu projekta EELDR Data Carpentry; skupaj z našim odmočnjanim podjetjem Biosistemika vstopali o uporabi PCR v reševalni čas posvet溯 za predstavnika Minskovs za kmetijstvo, gozdarstvo in prehrano, Indeksčalnih služb, vodnokanalne in prehrambene storitve.}

At the FTO headquarters in Rome, Italy, we presented the LAMP technique, the newest methodology for isothermal amplification used in diagnostics of microbial pathogens and new generation sequencing. LAMP was additionally presented at EXPO in Milan, Italy.

As a co-organizer we participated at Metrology day and Fascination of Plants Day. One (1) patent is pending at the Slovenian Intellectual Property Office.

In 2015 members of the FTO achieved several awards: Kristina Gruden was awarded the GPS Certificate of Recognition for significant achievements in scientific, research and development activities in the field of systems and molecular biology; Maja Ramljak received the silver plaque at the Society for Plant Protection for special achievements in the field of plant protection; Marina Dermastis won the first prize in the national science at work competition for the best popular scientific article and the Lepape Prize awarded by the Slovenian Biochemical Society for her achievements in popularizing Slovene biochemistry and molecular biology; Jana Erjavec received the Koka Award for special achievements in her doctoral dissertation.
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**ODDELEK ZA GENETSKO
TOKSIKOLOGIJO
IN BIOLOGIJO RAKA**

**KAKOVOST DOLJA IN ZDRAVE LJUDI**

**Sta nelocilna**

**Vodilc: prof. dr. Milan Filinčič**

**Hlajenje najbolje!**

Področja genetske analize in spektrometrije:
- Raziskave modelov ter modifikacij genetskega in odraženja celic in bićev (kompetentnosti ter odraženja).
- Raziskave in testiranje kmetijev v genetski tehnologiji.

Področja raziskav na poudarek rumevanje in nagevanje rumevanja rumevlasnikov:
- Raziskava uporabe različnih razina in različnih razina celic in restoranc ter proračuna zdravja.
- Raziskava uporabe različnih razina celic in restoranc ter proračuna zdravja.
- Področja analiziranih razina tehnik skala.
- Raziskava težav in raziskavi zdravja in izpopolnjevanja položaja zdravstva v različnih tehnologijalnih celicah.
- Monitoring in proračun za potrebovanje zdravstvenih celic.

**Na več področij:**
- analiza in raziskovanje za potrebovanje zdravstvenih, zdravstvenih in všečine občinskih organizacij.

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**DEPARTMENT FOR GENETIC
TOXICOLOGY AND CANCER BIOLOGY**

**QUALITY OF ENVIRONMENT AND HUMAN HEALTH ARE INSEPARABLE**

**Head Prof. Dr. Mojca Filipič**

**Topic summary:**

- Research in genetic-toxicology techniques:
  - studies of molecular mechanisms and genotoxicity of environmental and foodborne contaminants;
  - development of new in vitro toxic systems in genotoxicology.
- Research in the mechanism of cancer development and progression techniques:
  - studies of the role of life cycle systems, tumor microenvironment and different types of stem cells research on applications of murine stem cells or vectors for drug delivery.
- Environmental research techniques:
  - studies and development of methods for surveillance and prevention of the consequences of toxic exposure in the environment;
  - monitoring and management for the purpose of better water management.
- We partner research in collaboration with partners and stakeholders from industry, governmental institutions and academic organizations.

**Important achievement in 2015:**

In 2015 we successfully completed the four year EU 7 FP project Cytoscend (FaO and effects of cytotoxic pharmaceuticals in the environment and the identification of biomarkers for an improved risk assessment of environmental exposure), while we also coordinated five (5) projects from seven (7) European countries with comprehensive expertise collaboration in the...
We continued ongoing research on mechanisms of progression and invasion of extremely invasive locoregional breast cancer (GIMB). In particular, we focused on the role of GIMB stem cells and interactions of GIMB with tumour microenvironment. With gene expression analysis, we confirmed in comparison to normal tissue catenin K was the most significantly upregulated protein in GIMB cells. Further studies demonstrated that in the breast tumour tissue titin enzyme most probably occupies the GIMB stem cell niches where it is co-localised with chemokine SDF-1. The latter binds to its receptor (CD44) recruiting GIMB stem cells in vitro. Catenin K cleaves the phosphatidylinositol and, consequently, more aggressive tumour growth. These findings were published in The Journal of Histotechnology and cytotechnics, and in the review article in the journal Seminars in Cancer Biology.

Our proteomic studies of the most sensitive biomarkers of GIMB stem cells (CD44) and as potential targets in breast tumor treatment identified the tetratranscript (C31g). The studies of its role in the processes, associated with progression of GIMB, demonstrated that cells with silenced expression of C31g showed less invasive than control cells, expressed fewer genes that are necessary for the parent cell phenotype and were more susceptible to treatment with chemotherapeutic agents. We have also found that mesenchymal stem cells (MSC) significant impact on these properties of GIMB cells, which is important for their potential use in cell therapy. The findings were published in two scientific articles in journals Oncotarget and Cell Transplantation.

In our studies of interactions of GIMB with its micro environment we discovered a heterogeneous reaction of different types of GIMB (U77 cells that are of neuronal nature and U373 cells that express mesenchymal phenotype). In contact with the MSC, GIMB cells have shown that the interactions between different types of GIMB cells can influence the processes of proliferation, invasion and genomic stability. Moreover, the interaction between heterogeneous GIMB cells may also contribute to increased or reduced effect of the chemotherapeutic agent (e.g., temozolomide) on tumour cells. These findings were published in the journal Oncotarget.

Experimental models with zebrasibs (Ganio rats) are becoming increasingly important tools in cancer research. In the study of the GIMB invasion we applied...
temple, apply to the study of micro targets in suspension, which are continuously moving or rotating, so that the particle motion is governed by the Brownian motion. These targets can be either static or dynamic, and their motion should be characterized by the Brownian motion. The principle of detection and measurement is based on the maintenance of micro-particles in suspension that is changing continuously.

through the sensor field of detection. The particles are maintained in suspension by a high-speed laser beam, and the signal from the particles is detected using a high-speed camera. The principle of detection and measurement is based on the maintenance of micro-particles in suspension that is changing continuously.

the intranuclear location of the particles, two characteristics of the resulting signal can be distinguished: the average signal, which represents the concentration of intracellular proteins, and the characteristic deviation caused by the individual micro-particles entering the optimum detection field of the sensor. The advantage of this method is that it allows the study of particles and their interactions in real time, even if they are moving or rotating. The principle of detection and measurement is based on the maintenance of micro-particles in suspension that is changing continuously.

Leta 2015 smo v sodelovanju s partnerji smo na Erm več pokazali uporabo in razvojovanje metod, ki omogočata razlikovanje in razpoznavanje sestavnikov, struktur in morfologije nuklejskih molekul in njihovih sprememb ter sučajem s pulzirno in inducirano osvetlitvijo. Princip razpoznavanja je sprememba xenonimplantation of fluorescent GMB cells (GMB cInG and GMB cInG) as well as fluorescent cells injected, and observed their distribution in the brain and the nervous system. After the injection, the cells are moving and spread within the central nervous system along the spinal cord. The frequency of localization of the two cell lines was different: U87 cells did not move further. When we injected dorsal cInG cultures of human brain neurons in GMB cInG and GMB cInG we observed the promotion of the invasive of GMB14 by MScs. The findings were published in The Journal of histology and cytochemistry.

In cooperation with our partners we submitted a patent application to the European Patent Office. The patent describes a method that permits simultaneous non-invasive differentiation of composition, structure and morphology of micro-particles in suspension, and changes with the help of pulsed-induced light exposure. The principle of detection and measurement is based on the maintenance of micro-particles in suspension that is changing continuously.
NIB INFRASTRUCTURAL CENTRE

Hoed. Assist. Prof. dr. Manuela Pompe Novak

The infrastructure Centre at the NIB comprises two integrated programmes, the Plants Infrastructure Centre (Plants IC), which is part of the Department of Biotechnology and Systems Biology, and the PMBS Infrastructure Centre (PMBS IC) as part of the Pea Marine Biology Station (PMBS). The NIB infrastructure Centre is co-financed by the Slovenian Research Agency (ARRS) through the NIB Infrastructure Programme (NIB IP). Each part of the NIB IC offers services and equipment to the public and private sectors.

The large infrastructural equipment of Plants IC consists of:

- a transmission electron microscope (Phillips CM100) with a CCD camera co-owned by the National Institute of Biology (NIB) and the Department of Biology of the University of Ljubljana (UL),
- a cryo-ultramicrotome (Leica EM FC000) and ultramicrotome (Leica),
- a confocal scanning microscope (Leica TCS LSR),
- a time-resolved photometry (NIB JHRH Fast, Roche Light Cyclor 460 and ABI PRISM 5700),
- an array washer (Biomek iRobot Q100, Biomek Q200 and Flinders Biotech B400),
- a robot for protein crystallization (Flisson Microtek START) for parallel screening of enzymes and alleles,
- a robot for the preparation of microtome sections.

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In addition, the infrastructure Centre at the NIB IC offers services and equipment to the public and private sectors.

The large infrastructural equipment of PMBS IC consists of:

- a PH-800 research vessel, which is equipped with sophisticated navigation and marine research equipment,
- a Flisa oceanographic vessel, which is equipped with meteorological and oceanographic instruments (a multiparameter CTD and current meter),
- a smaller vessel suited for fast ice research and sea, and
- a high frequency radar (HF Radar).

Plants IC's equipment supports research activities, monitoring and training courses are arranged for frequent users, and services on the large equipment are offered to those preparing to order analyses.

The PMBS IC supports the research and educational activities for marine and other public institutions as well as the educational activities carried out at PMBS. The infrastructure Centre at the NIB IC is equipped with the new generation of equipment that is capable of carrying out research in marine and coastal environments. The PMBS IC offers a suite of services, including:

- a high frequency radar (HF Radar),
- a high resolution bathymetry and navigation system, and
- a satellite control station.

PMBS IC's equipment ensures that the data on sea conditions is of high quality and that it is available in real time.

In the year 2015, the infrastructure Centre at the NIB IC was used by the scope of research activities of 103 different users. Our goal to maintain a large number of users despite budget cuts for science in Slovenia was achieved.

Subjects of research and analyses, carried out at the NIB IC, are extremely diverse. The large number of users indicates the Importance of research equipment at the NIB IC for Slovenia in a wide range of research areas, for various enterprises, and for all sectors of society.

ICP ARP je leta 2015 dopolnil glavno radično ploščato (Matrix HR), namenjen za poboljšanje kvalitete, z manjšim radičnim podrobnikom, ki podobi signal na analizi jugu, pri kateri je zmanjšana razbininga. Določilo, ki je z izradou fresnih ploščat in kvarčnega podrobnika, je imenovalo na stran prilagoditev glasitosti.

Tako je slednja pokritost skoraj ceslja slovenskega territorialnega morja.

The NIB IC carefully, regularly and professionally maintains its major infrastructural equipment. Special care is devoted to permanent modernisation of equipment. In 2015 the Planta IC supplemented its equipment with QX200™ Droplet Digital™ PCR System (Biorad QX200) that consists of the automated QX200 droplet generator, the QX200 droplet readout, computer and software. The system enables the preparation and analysis of nucleic acids in different samples with droplet digital PCR (dPCR). The automated QX200 droplet generator provides analysis tool, redox reactions and increases reproducibility of results. The QX200 droplet readout enables the use of TaqMan hydrolysis probe and fluorescent dyes e.g., FAM/Eclipse.

In 2015, the primary Hi-Fi transmitting pair of antennas set up at the lighthouse (called the Piran harbour lighthouse) was upgraded with a secondary pair that transmits the signal towards the south, to the bay of Piran. This secondary pair is timed to be the master pair through GPS signal. It is set up on the other side of the Piran city theatre and radio from view of the south-south by using both pairs of transmitting antennas we succeeded to get excellent coverage of the entire Gulf of Piran, including Slovenian territorial waters. The web page (http://www.nib.si/mapi/ocenjevati/ocenjevati.htm) offers measurements of surface currents to the public in near real-time. Raw data gathering from the transmitting antennas in Piran and those in Kvarča (Italy) is done automatically digitized and presented as vector image. Raw data are also used in the modelling of solutions performed at the Piran Marine Biology Station.

The NIB IC’s equipment supports activities in research, work bodies of ministries, enterprises and education. The NIB IC is a research collaborative between researchers active in different research programmes, projects and institutions. It facilitates connections of researchers with users that include national budget users and various industries. It facilitates exchanges of research findings and educational processes as well. The NIB IC possesses up-to-date and well maintained research equipment (in accordance with the ISO/IEC 17025 system) which is essential for competitive research performance in life sciences and applied projects in collaboration with enterprises.

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