Unit Self Assessment Report

1. GENERAL INFORMATION

Institution	**Vilnius University**
Internet home page (english)	http://www.ibt.lt/en/title.html
Name of the Unit of Assessment (UoA)	**Institute of Biotechnology**
Composition of the Unit of Assessment (UoA) (Division, Head Name, Surname)	Department of Protein-Nucleic Acids Interaction, Head Virginijus Šikšnys Department of Biological DNA Modification, Head Saulius Klimašauskas Department of Eukaryote Genetic Engineering, Head Gintautas Žvirblis Department of Immunology and Cell Biology, Head Aurelija Žvirblienė Department of Biothermodynamics and Drug Design, Head Daumantas Matulis Department of Bioinformatics, Head Česlovas Venclovas Sector of Applied Biocatalysis, Head Inga Matijošytė Sector of Microtechnologies, Head Linas Mažutis
Contact person for the Evaluation (name, surname)	Jūratė Makariūnaitė
Phone	3705 260 2 109
E-mail	jurate.makariunaite@bti.vu.lt

2. UNIT'S RESEARCH PROFILE

Fields of Research	Time, %
P Biochemistry	51,1
B Biology	21,0
T Chemical engineering	16,7
P Chemistry	5,9
B Biophysics	2,0
P Informatics	1,0
P Mathematics	1,0
P Physics	1,0
B Botany	0,3
Total	**100**

3. RESOURCES

3.1. Unit staff at 2014 03 31

Position	FTE	Per cent from FTE for R&D	Persons
3111 Professors			
3112 Associated Professors (doc.)			
3113 Lecturers			
3114 Assistants			
3121 Chief Researchers (vyriaus.m.d)	9,5		9
3122 Senior Researchers (vyresn.m.d.)	19		25
3123 Researchers (m.d.)	16,25		26
3124 Junior Researchers (j.m.d.)	28,86		42
3125 Postdoctoral Researchers (mokslininkai stažuotojai)	2		2
3126 Other researcher without degree (tyrėjai, etc.)	26		37
3131 Administrative personnel (includes all administrative personnel)	7,25		9
3132 Technical personnel (includes all technical personnel)	35,75		53
Total number of UoA emploees:	144,61		203

3.2. Staff in FTE

Position	2011	2012	2013
3211 Professors			
3212 Associated Professors			
3213 Lecturers			
3214 Assistants			
3215 Postdoctoral researchers (among the above)			
3221 Chief Researchers	8,75	9,75	9
3222 Senior Researchers	16	16,75	19
3223 Researcher	18,75	14,5	16,25
3224 Junior Researchers	27,61	27,36	28,11
3225 Postdoctoral Researchers		2	3
3231 Administrative personnel (includes all administrative personnel)	8,25	7,5	7,25
3232 Technical personnel (includes all technical personnel)	56,85	49,5	61,25

FTE refers to annual full-time work. An FTE of 1,0 means that the person is equivalent to a full-time worker, while an FTE of 0,5 signals that the worker is only half-time.
Active research staff includes persons who plan, produce and publish new knowledge, theories and methods as well as products and processes based on them and lead research projects.
Technical personnel refer to persons working under the supervision of active research staff to carry out projects but who are not involved in the theoretical planning, publishing or other related activities.
Administrative personnel refer to persons who take care of administrative tasks related to the research, such as financial and personnel administration or other office duties but who are not normally involved with the technical implementation of the projects.

4. RESEARCH OUTPUT

4.1. Describe the Unit's research activities and output

411 What are the main fields, topics and focus of research at the Unit?

Founded in 1975 as an independent research institution, now part of Vilnius University, the Institute of Biotechnology (VU_IBT) strives to maintain the high standards of excellence in scientific endeavour, research training and technological advance with its main focus in a broadly defined field of molecular biotechnology including nucleic acid and protein technologies, bioinformatics, molecular diagnostics, drug design, next generation epigenomic and gene editing technologies. The Institute provides an interface between advanced education, basic research and technological development for the economic and social benefit of Lithuania.
Major topics of both basic and applied research are:
• structure-function analysis of enzymes that act on nucleic acids;
• development of molecular tools and technologies for genomic and epigenomic analysis and gene editing;
• production of viral proteins in yeast for development of monoclonal antibodies and diagnostics;
• design, synthesis, and characterization of novel chemical compounds with therapeutic, particularly anticancer, activities;
• development and application of computational methods to study structure, function and evolution of proteins and their complexes;
• micro-total-analysis-systems (μTAS) for various applications in biotechnology and biomedicine;
• search for enzymes with new functionalities and their development towards applied biocatalysis.

412 Has the Unit defined its strategic, long-term research plans – and if so, how does the Unit seek to realize those plans?

Long-term research plans of Institute of Biotechnology are coherent with the guidelines of Strategic Plan (2013-2020) of Vilnius University and are being discussed at annual meetings of the Board of the Institute and the International Advisory Board. The future strategy of the Institute is focused on the three major points: i) strengthen and consolidate on-going basic and applied biomedical research; ii) expand research into new areas/cutting edge technologies, iii) make the research sustainable by attracting young researchers ("young blood") as group leaders.

To achieve these long term goals a number of specific actions are envisioned: i) building of closer links between research and industry, ii) pro-active participation in the international research programmes and a deeper integration into ERA, iii) joining EMBC/EMBO and EMBL to get access to large international research infrastructures and cutting-edge technologies at pan-European research centres, iv) strengthening international cooperation, v) developing programmes to foster young talents.

Institute has already taken solid steps towards realizing these plans. It has actively participated in a number of international projects namely, EC COST, Baltic Sea Region Strategy, ScanBalt, FP7-REGPOT-2009-1 (Strengthening and sustaining the European Perspectives of molecular biotechnology in Lithuania). Most recently, Institute of Biotechnology together with Lithuanian University of Health and Kaunas Technology University and core partners, Lund University, Karolinska Institute (Sweden) and VTI (Finland) has a proposal to the HORIZON 2020 Teaming programme. These steps emphasize both the strong motivation and the ability of the Institute to act in becoming a more productive and visible research entity within ERA.

In the framework of the FP7-REGPOT project VU_IBT attracted two young talented researchers (Dr.Smirnovas and Dr.Mažutis) that both established their independent research groups at the Institute. In addition to new research topics brought by the new group leaders, through the competence of Dr.Mažutis' group the Institute has gained access to the cutting-edge microfluidics technology.

In summer of 2015 Institute will become a part of Life Sciences Centre that will consolidate facilities and personnel of currently three separate entities of Vilnius University, namely, Faculty of Natural Sciences, Institute of Biochemistry and Institute of Biotechnology. As such, Life Sciences Centre will serve as a platform for strengthening biomedical research and molecular biotechnology.

413 How does the Unit develop and maintain structures and practices that foster good research and help early-career researchers to make their way into the profession?

1. For many years the Institute of Biotechnology has in place an incentive system for the fostering of quality scientific publications and patenting. This system (annual performance -based salary supplement) was instrumental in increasing the number of papers published by VU_IBT scientists.
2. The quality of research papers is stimulated by an additional financial incentive and the Director 's prize for publications in top-tier scientific journals (IF>9). All authors of such articles are equally stimulated, regardless of their age and position.
3. VU_IBT researchers actively participate in organizing the annual conference of Young Lithuanian Scientists "Biofuture" with the Lithuanian Academy of Sciences serving as an umbrella organization and annual meeting and scientific conference of the Biochemical Society of Lithuania which are actively attended by young scientists

414 Is there a shared plan for publishing the research results, for employing research personnel and guiding the research of the Unit? Please explain.

The policy of the Institute of Biotechnology has always been directed towards fostering high quality publications and patents. Recently, this policy has gained support from the Research Council of Lithuania, the main granting agency in Lithuania. The Research Council has introduced a programme to cover expenses for publishing in open access journals. The central condition in this support programme is the requirement that open access journals belong to the top quartile within their respective fields according to the Web of Science ranking. Therefore, this new Lithuania-wide programme is in perfect alignment with the publishing policy of the Institute of Biotechnology.

VU_IBT is the leader in attracting the best students into PhD studies. PhD graduates of IBT are regularly awarded the National prize for the best PhD in the field of Life Sciences by President of the Republic of Lithuania. After doctoral studies many former PhD students continue their careers outside of the Institute including the industry or laboratories abroad. However, a fraction of motivated and talented graduates are employed at Institute of Biotechnology.

Oversight and guidance of the research personnel at the Institute is performed by its Promotion and Qualifications Commission. Research personnel are employed in a competitive procedure, and every five years the performance of each researcher is evaluated against the formal requirements of his/her position that are more stringent than the mandatory requirements of the Vilnius University. In addition, the Institute organizes annual meetings at which not only laboratory heads, but every researcher presents his/her results during the last year and these results are evaluated by the Board of the Institute.

415 What are the main types of your research outputs? Are they interdisciplinary or multidisciplinary? Also, describe the role of basic and applied research.

The main research outputs of the Institute are:
• Scientific publications in the internationally recognized journals;
• International patent applications and patents (many of them licensed);
• Spin-offs based on the research performed at the Institute (examples include Thermo Fisher Scientific Baltics, Sicor-Biotech Teva, UAB Biocentras, UAB Profarma, UAB Nomads, UAB IMD Technologies, UAB Baltymas, UAB ThermoPharma Baltic);
• Obtained national and international grants;
• PhD theses defended at the Institute.

Biomedical research is becoming an increasingly important discipline requiring multidisciplinary and coordinated efforts to generate new knowledge that could be translated into improving human health. Therefore, it is essential to stimulate collaborations between academic, industrial and governmental sectors in order to keep sustainable economy growth and competitiveness. VU_IBT is putting a lot of efforts to strengthen its scientific quality and performance by promoting multidisciplinary approaches in research, enhancing interregional collaborations and supporting the exploitation of R&D results.

In a broad field of molecular biotechnology and biomedical research it is both difficult and counterproductive to separate research into basic and applied, because they usually complement each other. Top-level basic research usually attracts interests from industry partners. For example, the fundamental research carried out in the Department of DNA – Protein Interaction aimed to understand molecular mechanisms of bacterial defence mechanisms against bacteriophages resulted in the development of new instruments and technologies for genome editing that was patented and successfully licensed. Another example concerns basic research of DNA methylation. Results of basic research have led to the development of a new biopolymer labelling technology (named mTAG) which has been patented and licensed to the industry. Thus, the Institute through its policy tries to ensure a high level of research independently if it is basic or applied.

4.2. Number of scientific publications and other outputs

Source: SCOPUS

2009	2010	2011	2012	2013	Total	International	Cited	Citations	excl. self cit.	H	excl. self cit.
4212 Publications in Journals, Conference Proceedings, Book Series, Books, Trade Publications in SCOPUS											
50	42	46	58	47	243	137	206	2547	1844	24	19
4211 Number of original articles in anonymously refereed scientific journals cited in SCOPUS											
40	33	41	52	39	205	113	179	2367	1752	23	19

Source: National Data Base of Publications and Evaluation unit	2009	2010	2011	2012	2013
4213 Articles in refereed scientific edited journals and conference proceedings (all outcomes)	21	26	30	40	35
4214 Monographs published (all outcomes)					
4215 Text books (vadovėliai)					
4216 Doctoral theses published	1	1	5	4	2
4217 Articles, radio and television programmes, journals, exibitions popularising science			1		
4221 Patents granted by EPO, USPTO, JPO		1	3	2	1
4222 Registered plant varieties					
4223 Registered breeds					
4224 Prototypes		1			1

4.2.3. Short description

4231 Patents

Weinhold E., Dalhoff C., [Klimašauskas S.], [Lukinavičius G]. New S-adenosyl-L-methionine analogues with extended activated groups for transfer by methyltransferases.JP 129120 B2. 2013-01-23
[Matulis D.], [Cikotiene I.], [Kazlauskas E.], [Matuliene J.].5-aryl-4-(5-substituted 2,4-dihydroxyphenyl)-1,2,3-thiadiazoles as inhibitors of Hsp90 chaperone and the intermediates for production thereof.US 831413220. 2012-12-20
[Matulis D.], [Cikotiene I.], [Kazlauskas E.], [Matuliene J.].5-aryl-4-(5-substituted 2,4-dihydroxyphenyl)-1,2,3-thiadiazoles as inhibitors of Hsp90 chaperone and the intermediates for production thereof. EP 2268626 B1. 2012-02-01
[Matulis D.], [Dudutienė V.], [Matulienė J.], [Mištinaitė L.].Benzimidazo[1,2-C][1,2,3]thiadiazol-7-sulfonamides as inhibitors of carbonic anhydrase and the intermediates for production thereof. EP2054420. 2011-06-22
Weinhold E., Dalhoff C., [Klimašauskas S.], [Lukinavičius G.]. New S-adenosyl-L-methionine analogues with extended activated groups for transfer by methyltransferases.US 8,008,007. 2011 08 30
[Žvirblienė A.], [Gedvilaitė A.], Ulrich R., [Sasnauskas K].Process for the production of monoclonal antibodies using chimeric VLPs.US 7919314 B2. 2011-04-05
Weinhold E., Dalhoff C., [Klimašauskas S.], [Lukinavičius G.]S-adenosyl-L-methionine analogues with extended activated groups for transfer by methyltransferases. EP1874790. 2010-08-18

4232 Registered plant varieties

4233 Registered breeds

4234 Prototypes

Hybridoma cell line 11A2, deposited at DSMZ (Deutsche Sammlung von Microorganismen und Zellkulturen, DSMZ, http://www.dsmz.de) under accession number DSM ACC3097, date of the deposit: 2010-11-10;
Hybridoma cell line HB-1, deposited at DSMZ under accession number DSM ACC3228, date of the deposit: 2013-02-06

4.3. List of most important publications by academic personnel and researchers

(max 20 publications)

1. [Kriukienė E.], Labrie V., Khare T., [Urbanavičiūtė G.], [Lapinaitė A.], Koncevičius K., Li D., Wang T., Pai S., Ptak C., Gordevičius J., Sun-Chong Wang., Petronis A., [Klimašauskas S.]: DNA unmethylome profiling by covalent capture of CpG sites. Nature Communications 2013, (4):2190. http://www.ncbi.nlm.nih.gov/pubmed/23877302
2. [Sinkunas T.], [Gasiunas G.], Waghmare S.P., Dickman M.J., Barrangou R., Horvath P., [Siksnys V.] : In vitro reconstitution of Cascade-mediated CRISPR immunity in Streptococcus thermophilus. The EMBO Journal 2013, 32(3):385-94. http://www.ncbi.nlm.nih.gov/pubmed/21344558
3. [Gasiunas G.], [Siksnys V.]: RNA-dependent DNA endonuclease Cas9 of the CRISPR system: Holy Grail of genome editing? Trends in Microbiology 2013, 21(11):562-7 http://www.ncbi.nlm.nih.gov/pubmed/24095303
4. [Mazutis L.], Gilbert J., Ung W.L., Weitz D.A., Griffiths A.D., Heyman JA. Single-cell analysis and sorting using droplet-based microfluidics. Nature Protocols 2013, 8(5):870-91. Downloaded over 10.000

timeshttp://www.nature.com/nprot/journal/v8/n5/full/nprot.2013.046.html
5. [Kriukienė E.], [Liutkevičiūtė Z.], [Klimašauskas S.]:5-Hydroxymethylcytosine - the elusive epigenetic mark in mammalian DNA. Chemical Society Reviews 2012, 41(21):6916-30. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3467341/pdf/nihms-401846.pdf
6. [Gasiunas G.], Barrangou R., Horvath P., [Siksnys V.]: Cas9-crRNA ribonucleoprotein complex mediates specific DNA cleavage for adaptive immunity in bacteria. Proceedings of the National Academy of Sciences of the USA 2012, 109(39):E2579-86 http://www.ncbi.nlm.nih.gov/pubmed/21344558
7. Khare T., Pai S., Koncevicius K., Pal M., [Kriukiene E.], [Liutkeviciute Z.],Irimia M., Jia P., Ptak C., Xia M., Tice R., Tochigi M., Moréra S., Nazarians A., Belsham D., Wong A.H., Blencowe B.J., Wang S.C., Kapranov P., Kustra R., Labrie V., [Klimasauskas S.], Petronis A.: 5-hmC in the brain is abundant in synaptic genes and shows differences at the exon-intron boundary. Nature Structural Molecular Biology 2012, 9(10):1037-43. http://www.ncbi.nlm.nih.gov/pubmed/22961382
8. [Tomkuviene M.], Clouet-d'Orval B., [Cerniauskas I.], Weinhold E., [Klimasauskas S.]: Programmable sequence-specific click-labeling of RNA using archaeal box C/D RNP methyltransferases. Nucleic Acids Research 2012, 40(14):6765-73.http://www.ncbi.nlm.nih.gov/pubmed/22564896
9. [Liutkevičiūtė Z.], [Kriukienė E.], [Grigaitytė I.], [Masevičius V.], [Klimašauskas S.]: Methyltransferase-directed derivatization of 5-hydroxymethylcytosine in DNA. AngewandteChemie International Edition 2011, 50(9):2090-3. very importanthttp://www.ncbi.nlm.nih.gov/pmc/articles/PMC3137911/
10. [Sinkunas T.], [Gasiunas G.], Fremaux C., Barrangou R., Horvath P., [Siksnys V.]: Cas3 is a single-stranded DNA nuclease and ATP-dependent helicase in the CRISPR/Cas immune system. The EMBO Journal 2011, 30(7):1335-42. http://www.ncbi.nlm.nih.gov/pubmed/21343909
11. [Gerasimaite R.], [Merkiene E.], [Klimasauskas S.]: Direct observation of cytosine flipping and covalent catalysis in a DNA methyltransferase. Nucleic Acids Research 2011, 39(9):3771-80. featuredhttp://www.ncbi.nlm.nih.gov/pubmed/19783820
12. [Sapranauskas R.], [Gasiunas G.], Fremaux C., Barrangou R., Horvath P., [Siksnys V.]: The Streptococcus thermophilus CRISPR/Cas system provides immunity in Escherichia coli. Nucleic Acids Research 2011, 39(21):9275-9282. F1000 evaluation http://nar.oxfordjournals.org/content/39/21/9275.full.pdf+html
13. [Kazlauskas D.], [Venclovas C.]: Computational analysis of DNA replicases in double-stranded DNA viruses: relationship with the genome size. Nucleic Acids Research 2011, 39(19):8291-305.http://www.ncbi.nlm.nih.gov/pubmed/21742758
14. [Zaremba M.], [Siksnys V.]: Molecular scissors under light control. Proceedings of the National Academy of Sciences of the USA 2010, 107(4):1259-60. http://www.ncbi.nlm.nih.gov/pubmed/20133886
15. Warner D.F., Ndwandwe D.E., Abrahams G.L., Kana B.D., Machowski E.E., [Venclovas C.], Mizrahi V.: Essential roles for imuA'- and imuB-encoded accessory factors in DnaE2-dependent mutagenesis in Mycobacterium tuberculosis. Proceedings of the National Academy of Sciences of the USA 2010, 107(29):13093-8. http://www.ncbi.nlm.nih.gov/pubmed/20615954
16. [Matijošytė I.], Arends I.W.C.E., de Vries S., Sheldon R.A.: Preparation and use of cross-linked aggregates (CLEAs) of laccases. Journal of Molecular Catalysis B: Enzymatic 2010, (62):142-148 Top cited papers for 2010 and 2011 http://www.sciencedirect.com/science/article/pii/S1381117709002537
17. [Liutkeviciute Z.], [Lukinavicius G.], [Masevicius V.], [Daujotyte D.], [Klimasauskas S.]: Cytosine-5-methyltransferases add aldehydes to DNA. Nature Chemical Biology 2009, 5(6):400-2. F1000 evaluation http://www.ncbi.nlm.nih.gov/pubmed/19430486
18. [Gražulis S.], Chateigner D., Robert T. Downs, Yokochi A. F. T., Miguel Quiro´s, Lutterotti L., [Manakova E.], [Butkus J.], Peter Moeck and Armel Le Bail: Crystallography Open Database – an open-access collection of crystal structures. Journal of Applied Crystallogtaphy 2009, (42):726-729. http://www.ncbi.nlm.nih.gov/pubmed/22477773
19. Miropolskaya N., Artsimovitch I., [Klimasauskas S.],Nikiforov V.,Kulbachinskiy A.: Allosteric control of catalysis by the F loop of RNA polymerase.Proceedings of the National Academy of Sciences of the USA2009, 106(45):18942 18947.F1000 evaluation http://www.ncbi.nlm.nih.gov/pubmed/19855007
20. [Golovenko D.], [Manakova E.], [Tamulaitiene G.], [Grazulis S.], [Siksnys V.]: Structural mechanisms for the 5'-CCWGG sequence recognition by the N- and C-terminal domains of EcoRII. Nucleic Acids Research 2009,37(19):6613-24. http://www.ncbi.nlm.nih.gov/pubmed/19729506

5. DOCTORAL TRAINING AND POSTDOCTORAL RESEARCH

5.1. Number of students and postdoctoral researchers

	2011	2012	2013
511 The number of Master degrees awarded (as above)	13	11	20
512 The number of doctoral students enrolled	9	11	16
513 Doctoral students employed as Lectures, Assistants or Junior Researchers	14	21	36
514 The number of enrolled in doctoral studies after completion of Master studies at the same institution	4	10	13
515 The number of international doctoral students (non Lithuanian citizenship)		1	1
516 The number of doctoral degrees awarded	5	4	2
517 The number of international postdoctoral researchers (non-Lithuanian citizenship)			

511 Universities indicate the number of defended Master theses at the UoA. Research institutes indicate Master students, if at least half of the Master thesis has been performed at research institute under the guidance of the research stuff of the institute.
516 PhD students are enrolled at the host universities and defend their theses there and Unit's personnel is also involved in supervising doctoral theses. Universities indicate the number of defended PhD theses supervised by Unit's personnel. Research institutes indicate PhD students, who performed their doctoral research at research institute under the guidance of the research staff of an institute.

5.2. Defence of doctoral theses, list of doctoral dissertations in 2009–2013

Name (given name and family name)	Topic of dissertation	Enrolment of studies	Approval of dissertation	Field of research	Form of study (full time or part time)	Language of dissertation
Miglė Tomkuvienė	Methyltransferases as Tools for Sequence-Specific Labeling of RNA and DNA	09/2006 - 08/2010	12/2013	biochemistry	full time	Lithuanian
Lina Baranauskienė	Analysis of Ligand Binding to Recombinant Human Carbonic Anhydrases I, II, VII, IX and XIII	09/2006 - 08/2010	03/2013	biochemistry	full time	Lithuanian
Giedrius Gasiūnas	Mechanism of DNA interference by Type II CRISPR/Cas systems	10/2007 - 09/2011	12/2012	biochemistry	full time	English
Dmitrij Golovenko	Structural And Functional Studies of Restriction Endonucleases EcoRII, BfiI and Bse634I	10/2004 - 09/2011	11/2012	biochemistry	full time	English
Arūnas Šilanskas	Restriction Endonuclease-Triplex Forming Oligonucleotide Conjugates With Controllable Catalytic Activity	07/2002 - 06/2006	06/2012	biochemistry	full time	English
Zita Liutkevičiūtė	Cytosine methyltransferase-directed reactions involving non-cofactor-like compounds	10/2007 - 09/2011	03/2012	biochemistry	full time	Lithuanian
Evaldas Čiplys	Analysis of maturation of measles virus hemaglutinin in yeast S.cerevisiae and P.Pastoris secretory pathway and humanization of Yeast cells	10/2007 - 09/2011	12/2011	biochemistry	full time	Lithuanian
Eglė Mažeikė	Generation of model anticancer vaccine based on virus-like particles	10/2005 - 09/2009	06/2011	biochemistry	full time	Lithuanian
Mindaugas Juozapaitis	Synthesis of Paramyxoviridae nucleoproteins in yeast Saccharomyces Cerevisiae and their application in viral diagnostics	10/2004 - 09/2008	06/2011	biochemistry	full time	Lithuanian
Indrė Kučinskaitė-Kodzė	Production, characterization and application of new monoclonal antibodies against viral antigens.	10/2005 - 02/2010	06/2011	chemical engineering	full time	Lithuanian
Rūta Gerasimaitė	A directed evolution design of target specificity and kinetic analysis of conformational transitions in the HhaI methyltransferase	09/2003 - 09/2007	05/2011	biochemistry	full time	Lithuanian
Raimundas Ražanskas	Interaction of B core protein and its mutant froms with humas liver protiens	07/1993 - 06/1997	11/2010	biochemistry	full time	Lithuanian
Rasa Sukackaitė	Structural and functional studies of the restriction endonuclease BpuJI	10/2004 - 09/2008	12/2009	biochemistry	full time	English

If at least half of the doctoral dissertation has been supervised and/or done at a research institute, the research institute can also list the doctoral dissertation as its own outcome.

5.3. Postdoctoral research

Name (given name and family name)	Topic of postdoctoral research	Beginning of postdoc research	End of postdoctoral research	Field of research	Where was doctoral degree awarded (title of institution, country)
Vytautas Petrauskas	Rational drug design by structural thermodynamics	2009/10	2011/ 09	Physics, Biochemistry	Vilnius University and Semiconductor Physics Institute, Lithuania
Milda Plečkaitytė	Generation of single-chain antibodies in yeast	2009 /10	2011/ 10	Chemical engineering	Institute of Biochemistry, Lithuania
Eimantas Astromskas	Exploitation of telomere maintanance pathway for gene stable integration nad multiplication into yeast genome	2009/10	2011/09	Biology	Lund University, Sweden
Vilma Petrikaite	Evaluation of human Hsp90 chaperone pharmacokinetics, toxicity and anticancer activity	2010/10	2012/09	Pharmacy	Kaunas University of Medicine, Lithuania
Justas Dapkūnas	Computational analysis of protein-protein interactions	2012/03	2014/ 02	Biochemistry / Informatics	Vilnius University, Lithuania
Remigijus Vasiliauskas	Development of advanced drug delivery particles using droplet-based microfluidics	2013/03	2015/02	Engineering/Pharmacy	Linkoping University, Sweden

Lina Jakutytė-Giraitienė	Localization and expression of Cas9 protein from Streptococcus thermophilus	2012/04	2015/03	Biochemistry	Universite Paris-Sud 11 and Vilnius University, France, Lithuania.

6. NATIONAL AND INTERNATIONAL COLLABORATION

6.1. Most important national research collaboration

Universities

Kaunas Medical University	project: Resistance to antibiotics of Lithuanian widespread pathogenic bacteria: molecular epidemiology and spreading prevention, 2009-2011
Lithuanian university of Health Sciences	project: Molecular mechanism of Alzheimer's disease, 2012-2014 publications in J Biomed Sci (2013), J Neurochem (2013)

Research institutes

Institute of Biochemistry	project: Detection of pathogenic beta-amiloid oligomers in Alzheimer's disease", 2008- 2010
Institute of Biochemistry	project:Structural and functional studies of T4 phage replisome, 2007-2009
Institute of Biochemistry	project:Use of Biotechnological methods for carbonic anhydrase inhibitors search, 2007-2009
Institute of Biochemistry, Institute of Botany	project: Development of Yeast expression system by using proteomic approach and gene engineering, 2008-2010
Institute of Biochemistry, Institute of Botany	project:Engagement of metagenomic analysis of extremophile viruses from hot underground waters of Lithuania searching for new enzymes, 2007-2009
Institute of Chemistry	project: Development and evaluation of biodegradable esthers of controlled flammability and resistant to aging, 2008-2010
Institute of Horticulture, Lithuanian Research centre for Agriculture and Forestry	project: Fruty plants - natural producers of anthocyanins", 2008-2010
Institute of Horticulture, Lithuanian Research Centre for Agriculture and Forestry	project: Biotechnological means for increasement of plants resistance to cold, 2008-2010
Institute of Physics	project: Functional nanodomains of proteins" . 2008- 2010
Institute of Oncology, Institute of Immunology	project: Deveopment of new tools for improved lanoratory diagnosis of human papilomavirus (HPV) infection and HPV related cancer, 2009-2011
Institute of Oncology, Institute of Biochemistry	project:Design of technologies of recombinant proteins of prolonged therapy, 2007-2009

Business

AB "Naujoji Ringuva"	project: Development of innovative biocatalytic stain remover, 2012-2013
AB "Sanitas"	project:Design of technologies of recombinant proteins of prolonged therapy, 2007-2009
UAB "Biocentras"	Project: Development of innovative biotechnology for oil base lubricant production, 2012-2013
UAB "Fermentas" (presently Thermo Fisher Scientific Baltics)	Project: Studies on DNA and hybrid meganuclease interaction, 2010
UAB "Fermentas" (presently Thermo Fisher Scientific Baltics)	project: Analysis of structural and molecular dynamics of mutants of thermostabele revert transcriptase,
UAB "Fermentas" (presently Thermo Fisher Scientific Baltics)	Project: Development of monoclonal antibodies against Taq polymerase and His5 peptide,
UAB "Fermentas" (presently Thermo Fisher Scientific Baltics)	project:New enzymes and thechnologies for epigenome analysis, 2007-2009
UAB "Fermentas" (presently Thermo Fisher Scientific Baltics)	project:Engagement of metagenomic analysis of extremophile viruses from hot underground waters of Lithuania searching for new enzymes, 2007-2009
UAB "Fermentas" (presently Thermo Fisher Scientific Baltics)	project: Generation, Construction, expression and purification of chimeric virus like particles for monoclonal antibodies against target peptides, 2012
UAB "Fermentas" (presently Thermo Fisher Scientific Baltics)	project: Deveopment of new tools for improved lanoratory diagnosis of human papilomavirus (Hpv) infection and HPV related cancer, 2008-2010
UAB "Fermentas" (presently Thermo Fisher Scientific Baltics)	Project: Analysis of new endonucleases specific to DNA methylation" 2009
UAB "Fermentas" (presently ThermoFisher Scientific Baltics), UAB "Sorpo"	project: Deveopment of new tools for improved lanoratory diagnosisof human papilomavirus (HPV) infection and HPV related cancer, 2009-2010
UAB "Profarma"	project: Development of humanized Yeast expression system, 2008-2010

UAB "Profarma"	project: Construction and analysis of recombinant tobacco cytokines,
UAB "Sorpo", UAB "Profarma"	project: Development of anti-cytolysin monoclonal antibodies designed to neutralize the toxic cytolysin of the pathogenic bacterias, 2008-2010
PET Group	project: Quality analysis of PET flakes, 2011
UAB "Nuostolių valdymas"	project: Analysis quality and thermostability of polymeric products, 2011
LT Biotech	Generation of monoclonal antibodies
UAB Baltymas	project: Stress response analysis on the proteome level in cells producing recombinant proteins, 2012, publication in Prot Expres Purif (2013)

6.2. Most important international research collaboration

Universities

Canada	Centre for Addiction and Menthal Health/Toronto University	NIH project: Approaches for genomic mapping of 5-hydroxymethylcytosine, a novel epigenetic mark in mammalian DNA, 2010-2012, joint publication in Nat Struct Mol Biol (2012)
Canada	Centre for Addiction and Menthal Health/Toronto University	NIH project:Methylome Profiling via DNA Methyltransferase directed Labelling, 2008-2010; joint publication in Nat communications, (2013)
Canada	Centre for Addiction and Menthal Health/Toronto University	Lithuanian Science and Study Foundation project: New enzymes and thechnologies for epigenome analysis, 2007-2009
Germany	Justus Liebig University	EC FP7 project: Strengthening and Sustaining the European Perspectives of Molecular Biotechnology in Lithuania, MOBILI, 2009-2013
Germany	Justus Liebig University	EC FP6 project: A multidisciplinary approach to the study of DNA enzymes down to the single molecule level, 2005-2009
Italy	Universite Vita-Salute san Raffaele	EC FP7 project: Pan-European Network For The Study And Clinical Management Of Drug Resistant Tuberculosis, TB PanNet, 2009-2013; joint publications in MBio (2014), Euro Surveill. (2011), J. Clin. Microbiol. (2012), Euro Surveill. (2010);
Norway	Oslo University	EC FP7 project: Metastatic tumors facilitated by hypoxic tumors, Metoxia, 2009-2013
Switzerland	Freiburg University	SWISS-LT project :Signalling control of pathogen induced plant immunity, 2013-2016;
United Kingdom	University of Edinburgh	EC FP7 project Strengthening and Sustaining the European Perspectives of Molecular Biotechnology in Lithuania, MOBILI, 2009-2013
USA	Harvard University	EC FP7 project: Integrated microfluidic system for long term cell Cultivation, monitoring and analysis, BioCellChip, 2012-2015

Research institutes

Austria	Gregor Mendel Institute of Molecular and plant Biology	Research Council of Lithuania project: Arabidopsis PP2C phosphatases and MAPKs that regulate plant development
Bulgaria	Institute of Experimental Pathology and Parasitology	LVMSF project : Deveopment of new tools for improved lanoratory diagnosisof human papilomavirus (HPV) infection and HPV related Cancer, 2008-2010; publication in Sci World J (2012)
Sweden	Karolinska Institute	EC FP7 project: Strengthening and Sustaining the European Perspectives of Molecular Biotechnology in Lithuania, MOBILI, 2009-2013
Switzerland	Swiss Institute of Bioinformatics	EC FP7 project: Strengthening and Sustaining the European Perspectives of Molecular Biotechnology in Lithuania, MOBILI, 2009-2013

Other public organisations

Germany	The European Molecular Biology Laboratory	EC FP7 project: Strengthening and Sustaining the European Perspectives of Molecular Biotechnology in Lithuania, MOBILI, 2009-2013

Other higher educational establishments, graduate schools, colleges

Switzerland	Eidgenössische Technische Hochschule Zürich	SWISS-LT project: Directed Evolution of computer engineered enzymes using based microfluidics, 2012-2016;

Business

Germany	Euroimmune AG	Recombinant nucleocapsid proteins of Puumala, Dobrava, Hantaan hantavirus
Sweden	Vironova AB	EC FP7 project: Development of Novel Antiviral drugs against Influenza, FLUCURE, 2010-2014

Switzerland	Pike Pharma GmbH	EC FP7 project :Small Molecule Inhibitors of the Trimeric Influenza Virus Polymerase Complex , FUINHIBIT, 2008-2010
UK	Abcam Ltd	Generation of of monoclonal antibodies
UK	Abcam Ltd	Generation of viral proteins
USA	Santa Cruz	Genertion of monoclonal antibodies
USA	DiaSorin	Generation of viral proteins

6.3. Visits abroad (minimum duration of visit: 15 days)

Name, surename	Target organisation	Country	Purpose of the visit	Duration in months	Year
Vaiva Kazanavičiūtė	Max F. Perutz Laboratories,University of Vienna	Austria	studies on signalling pathways in Arabidopsis by examining plant lines with mutated protein kinase and protein phosphatase genes	1	2010
Vaiva Kazanavičiūtė	Max F. Perutz Laboratory, University of Vienna	Austria	investigation of the connection between signal transduction components and cell cytoskeleton in Arabidopsis	1	2012
Dalia Daujotytė	Lexogen GmbH, Vienna, Austrija	Austria	internship	24	2012-2013
Edita Kriukienė	Centre for Addiction and Mental Health,	Canada	to introduce the workflow of the newly developed mTAG technology for large-scale genome-wide profiling of cysosine modifications	1	2011
Giedrius Gasiūnas	Academic and University Center	Czech Republic	training in protein crystalization methods	1,2	2010
Zigmas Toleikis	Niels Bohr Institute, University of Copenhagen	Denmark	learning techniques of using DSC, pressure calorimeter and vibrating tube densitometer to determine thermodynamics of proteins and protein binding with ligands	1	2010
Justina Rutkauskaite	Laboratoire de Biochimi, ESPCI Paris Tech Institute	France	to learn the main microfabrication techniques, improve microfluidic manipulation skills and learn mammalian cell culture methods,	2,5	2012-2013
Lina Jakutytė-Giraitienė	INRA, MICALIS, Jouy-en-Josas	France	joint research for Cas9 protein localization using the fluorescence microscopy	1,5	2013
Giedrius Vilkaitis	Institute Micalis INRA, Jouy-en-Josas	France	discussion of the possibilities and strategies of general gene regulation studies in bacterium Lactococcus lactis important for food technology and performed pilot experiments	0,5	2012
Giedrius Vilkaitis	Institute Micalis INRA, Jouy-en-Josas	France	present ation of current research data, participated in discussions and received a few valuable practical ideas for the planned experiments, the possibility of collaboration was considered as well as he has learned and practiced essential genetic and molecular techniques	0,5	2013
Robertas Galinis	Laboratoire de Biochimi, ESPCI ParisTech Institute	France	to learn new methods, such as basics in micro fabrication and microfluidics	2,5	2012-2013
Miglė Tomkuvienė	University of Paul Sabatier	France	revision of the previously written draft manuscript of the joint publication, literature analysis and discussion of a new hypothesis for joint project	0,5	2011
Linas Mažutis	Strasbourg University	France	production of several microfluidic chips (to be used back in Lithuania) using soft lithography techniques and tested their functionality as well as performed microfluidic experiments that allowed to enrich populations of cells producing specific protein binders	0,75	2011
Aistė Kasiliauskaitė	Heidelberg university	Germany	to learn the methodology of working with the heat shock protein 70 (Hsp70).	1,5	2013
Zita Liutkevičiūtė	Max Planck Institute for Developmental Biology	Germany	internership	5	2013
Georgij Kostiuk	TU Dresden, Biotechnologisches Zentrum	Germany	Learning of procedures on TIRF (total internal reflection fluorescence) setup	1	2011
Georgij Kostiuk	TU Dresden, Biotechnologisches Zentrum,	Germany	bulk FRET measurements of single- and double-labelled monomeric restriction endonuclease BcnI mutants with inverted confocal microscope	0,75	2012
Mindaugas Juozapaitis	Department of Virology, University of Freiburg	Germany	acquisition of methods applied in virology	2	2010
Eglė Aleksaitė-Mazeike	Friedrich-Loeffler Institute	Germany	acquisition of methods applied in virology and joint publication	6	2009
Milda Mickutė	Max Planck Institute for Plant Breeding RESEARCH	Germany	acquisition of new methods of encompassing analyses of methyltransferase HEN1 function in vivo	0,5	2013

Zita Liutkevičiūtė	Max Planck Institute for Developmental Biology	Germany	internship	5	2013
Aistė Kasiliauskaitė	University of Florence	Italy	learned the enzyme activity measurement by stopped-flow technique	0,75	2012
Joana Smirnovienė	University of Florence	Italy	to learn to use stopped-flow CO2 hydration assay for for measuring carbonic anhydrase activity		2011
Vilma Petrikaitė	Bellvitge Biomedical Research institute, Barcelona	Spain	learnig of the main aspects needed to carry out the in vivo experiments in nude mice using subcutaneous tumor xenograft model	2	2012
Mindaugas Margelevičius	Department of Plant Physiology, Umea University	Sweden	analysis of aspen (Populus) genome computationally	1	2010
Eimuntas Astromskas	Lund university, Department of Cell and organisma biology	Sweden	an extra training for deepening my knowledge and practical skills working with yeast telomere genetics	1	2009
Inga Pečiulienė	Karolinska Institutet	Sweden	studies on involvement of molecular chaperones in regulation of hypoxia inducible transcription factor under normal or hypoxic cell growth conditions	0,75	2011
Inga Pečiulienė	Karolinska Institutet	Sweden	studies on molecular mechanism of alternative HIF-3α splicing events in mouse eye tissue	0,75	2012
Justina Rutkauskaite	ETH Zurich, Institute for Chemical and Bioengineering	Switzerland	to improve practical skills in the field of microfluidics	1	2013
Milda Šulcienė	University of Applied Sciences and Arts Northwestern	Switzerland	acquiring new knowledge in protein immobilization	6	2013-2014
Robertas Galinis	ETH Zurich, Laboratory of Organic Chemistry	Switzerland	protein engineering and in vitro evolution	2,8	2013
Gražvydas Lukinavičius	Ecole Polytechnique Federal de Lausann	Switzerland	internship	36	2011-2013
Rūta Gerasimaitė	Universite de Lausanne, Epalinges, Šveicarija	Switzerland	internship	36	2011-2013
Andrius Merkys	MRC Laboratory of Molecular Biology	UK	retrieving suffiecient quality data from small molecule COD for statistical analysis	2	2012
Romanas Chaleckis	Cancer Research Center, University of Edinburgh	UK	training in biochemical methods like ELISA, Western blotting and cell cultures, and analysed two inhibitors	1,2	2010
Saulius Gražulis	University of York	UK	statistical COD data analysis	1,5	2009
Vytautas Smirnovas	Case Western Reserve University	USA	collaboration on prion research	1	2012
Linas Mažutis	Harvard University	USA	manufacture of several microfluidic chips that allow highly monodisperse droplet production, incubation, reinjection, analysis and sorting	1	2012
Linas Mažutis	MBL, Woods Hole	USA	expertise improvement in microscopy imaging, digital cameras, confocal and bright field microscopies, polarization microscopy, diffraction and interference fundamentals and various other aspects of microscopy as well as he also had hands-on experience on digital imaging processing, noise-to-background subtraction	1	2013
Vaidotas Kiseliovas	Houston Methodist Research Institute	USA	study of motion of micro- and nano-particles in microchannels	3,5	2013-2014
Rasa Rakauskaitė	University of Maryland; College Park	USA	to perform the experiment for the collaborative project "A universal method for recombinant synthesis of selenoproteins"	0,5	2013
Linas Mažutis	Harvard University, School of Engineering and Applied Sciences	USA	to implement EC FP7 project "BioCellChip"	24	2013-2015

6.4. Visits to the Unit (minimum duration of visit: 15 days)

Name, surename	Target organisation	Country	Purpose of the visit	Duration in months	Year
Jorge David Bolanos Calvo	Tecnologico de Monterrey University	Austria	to learn techniques of recombiant proteins production	10	2011-2012
Saulius Kulakauskas	Directeur de Recherche, Institut National de la Recherche Agronomique (INRA), Institut Micalis, Jouy-en-Josas	Austria	to perform the experiment for the collaborative project	0,8	2013
Alois Schweighofer	Max F. Perutz Laboratories,University of Vienna	France	Analysis of plant cell signaling mutants, their genotypes and phenotypes	6	2012

Christian Rick	University of Strasbourg	France	Setting up optical system for microfluidics station	0,5	2012
Alois Schweighofer	Max F. Perutz Laboratories,University of Vienna	Germany	Analysis of plant cell signaling mutants, their genotypes and phenotypes	3	2011
David Timm	University of Amsterdam	Holland	to learn techniques of recombiant proteins production	12	2011-2012
Theres Wollny	Friedrich-Loeffler-Federal Research Institute for Animal Health, Greifswald	Mexico	research on viral NP protein expression and preparation	0,5	2011
Anna Olchowik	International Institute of Molecular and Cell Biology	Poland	to perform computational analyses	8	2013-2014
Monika Sokolowska	International Institute of Molecular and Cell Biology	Poland	internship	1	2010

7. OTHER SCIENTIFIC AND SOCIETAL ACTIVITIES

7.1. Presentations made in the international scientific conferences

Country	Name, surename	Topic of presentation	Name and time of the conference
France	Saulius Klimašauskas	New chemo-enzymatic approaches for epigenome profiling	Jacques Monod Conference "DNA methylation and demethylation". 2013.09.14-17
Germany	Saulius Klimašauskas	DNA methyltransferases: structural studies and redesign for novel functions	3 rd European Conference on Chemistry for Life Sciences; 2009.09.02-05
Hungary	Saulius Klimašauskas	Exchange and derivatization of 5-hydroxymethyl groups catalyzed by cytosine methyltransferases	4 th European Conference on Chemistry for Life Sciences. 2011.08.31-09.04
Italy	Kliment Olechnovič	Comprehensive evaluation of protein structural models using CAD-score	EMBO Conference: Critical Assessment of Protein Structure Prediction (CASP10). 2012.12.9-12
Japan	Saulius Klimašauskas	Innate and designed catalytic versatility of SAM-dependent methyltransferases	Enzyme Engineering XXII. 2013.09.23-26
Japan	Česlovas Venclovas	Comparative protein structure modeling: an effective means to explore protein function	4 th International Biocuration Conference; The International Society for Biocuration. 2010.10. 11-14
Japan	Saulius Klimašauskas	Addition and exchange of cytosine-5 modifications in DNA using DNA methyltransferases	39 th International Symposium on Nucleic Acid Chemistry. 2012.11.15-17
Netherlands	Saulius Klimašauskas	Engineering methyltransferase reactions for targeted labeling of biopolymers	Enzyme Engineering XX. 2009.09.20-24
Norway	Saulius Gražulis	Use of the Crystallography Open Database as a source of prior knowledge for molecular modelling	27 th European Crystallographic Meeting (ECM27). 2012.09. 5-9
Russia	Giedrius Gasiūnas	Cas9 – a programmable RNA-guided DNA endonuclease from the bacterial adaptive immune system	38 th FEBS Congress, Mechanisms in biology. 2013.07.06-11.
Russia	Česlovas Venclovas	The use of interatomic contact areas for the assessment of RNA 3D structural models	38 th FEBS Congress. Mechanisms in biology 2013. 07.6-11
Spain	Saulius Gražulis	Crystallography Open Database: plans, wishes, perspectives	XXII IUCr (International Crystalographic Society) Congress, 2011.08.22 – 2011.08.31
Sweden	Daumantas Matulis	Structural biothermodynamics of inhibitor binding to human recombinant carbonic anhydrases	Carbonic Anhydrase meeting. 2011.09.16 – 18
UK	Virginijus Šikšnys	Molecular mechanisms of CRISPR systems	EMBO Conference "Helicases and Nucleic Acid Translocases. 2013.08.4-8
UK	Saulius Gražulis	Recent developments at the Crystallography Open Database	IUCr COMCIFs. 2013.08.23- 25
USA	Virginijus Šikšnys	Molecular mechanism of CRISPR-encoded immunity in Type II systems	FASEB Conference "Nucleic acids enzymes". 2012.06.10-15
USA	Saulius Klimašauskas	Chemo-enzymatic approaches for genome-wide profiling of cytosine modifications	FASEB SRC on Biological Methylation:From DNA & Histones to Disease. 2012.08.11-18
USA	Saulius Klimašauskas	Innate and designed catalytic versatility of DNA methyltransferases	International FASEB Summer Conference Biological methylation: from DNA to histones 2010.06.6-11
USA	Vytautas Smirnovas	Structural organization of brain-derived mammalian prions: New insights from hydrogen/deuterium exchange	The Molecular & Cellular Origins & the Biomedical Consequences of Protein Aggregation. 2011.06.12 – 17
USA	Virginijus Šikšnys	Functional analysis of Streptococcus thermophilus CRISPR/Cas System	4 th Annual CRISPR research meeting. 2011.07.12-13
USA	Virginijus Šikšnys	Enzymology of Streptococcus thermophilus CRISPR/Cas Systems	5 th Annual CRISPR research meeting. 2012.06. 20-22

7.2. Memberships in editorial boards of scientific journals

Name, surename	Journal (e.g. title and publishing house) and position on the boar	Period (month/year - month/year)
Saulius Klimašauskas	Central European Journal of Biology, Springer, Editorial Board member	2009- present
Saulius Klimašauskas	Proceedings of the Estonian Academy of Sciences, Estonian Academy Publishers, Editorial Board member	2009- present
Daumantas Matulis	BMC Biophysics, Biomed Central , Editorial Board member	2013-present

7.3. Prizes awarded to researchers, honours and scientific positions of trust

Name, surename	Prize, position etc.
Zita Liutkevičiūtė	Award of the Lithuanian Scientific Society for the best PhD theses of 2012
Linas Mažutis	Kestler Prize, 2010
Daumantas Matulis	Lithuanian Science Prize, 2012
Aurelija Žvirblienė	Lithuanian Science Prize, 2013
Saulius Klimašauskas	Saint Christophorus statue "Merits in Science", Vilnius Municipality, 2011
Virginijus Šikšnys, Giedrius Gasiūnas, Tautvydas Karvelis	VU Prize "Significant Achievements in Science", 2014
Saulius Klimašauskas	VU Prize "Significant Achievements in Science", Vilnius University, 2014
Saulius Klimašauskas	VU Recto'sr Science Prize „Achievements in Science" , Vilnius University, 2011
Edita Kriukienė	VU Rector's Science Prize „Achievements in Science" , Vilnius University, 2013
Zita Liutkevičiūtė	VU Rector's Science Prize for Young Scientists „Achievements in Science" , Vilnius University, 2012
Giedrius Gasiūnas	VU Rector's Science Prize for Young Scientists „Achievements in Science" , Vilnius University, 2013
Virginijus Šikšnys	VU Rector's Science prize „Achievements in Science" , Vilnius University, 2013

7.4. Memberships in committees and in scientific advisory boards of governmental bodies and business companies or other similar tasks of no primarily academic nature

Name, surename	Organisation	Tasks or position	Period (month/year - month/year)
Alma Gedvilaitė	Lithuanian GMO Surveillance committee	Expert group member	04/2011
Kęstutis Sasnauskas	MOSTA (Research And Higher Education Monitoring and Analysis Centre) for Smart specialization priorities areas	Expert group member	2013 - present
Kęstutis Sasnauskas	SKVC (Centre for Quality Assesment in Higher Education) for Study Programme Appeal	Member	2009-2010
Kęstutis Sasnauskas	MITA (Agency for Science Innovation and Technology): Industrial Biotechnology programme in Lithuania for 2011-2013	Chairman	04/2011
Kęstutis Sasnauskas, Leonas Pašakarnis, Rokas Abraitis, Inga Matijošytė	Lithuanian Biotechnology Association	Board members	2009 -present
Daumantas Matulis	Ministry of Science and Education, Evaluation of Scientific Research Results	Expert group member	2011-present
Aurelija Žvirblienė	Lithuanian Biochemical Society	Board member	2009 - present

8. THE UNIT'S SELF-ASSESSMENT

8.1. SWOT – evaluation of the Unit's scientific strengths, weaknesses, opportunities and threats

811 Strengths

- High quality and productive multidisciplinary research;
- A solid research training programme from the bachelor to PhD and postdoc levels;
- Adequate basic research infrastructure and instrumentation and access to nearby facilities;
- Extensive experience in managing and executing FP and other national and international programmes;
- Steady incoming stream of young talented students from the local universities;
- Good age balance of research personnel at all levels (the average age is 37 years, over 50% are younger than 35);
- A strong applied research component of national and international significance (patents, spin-offs);
- Productive relations with local and international biotech companies (Fisher Scientific Baltics, Sicor-Biotech Teva, Biocentras, Profarma,

Nomads, IMG Technologies, Baltymas)

812 Opportunities

• Integration into the multidisciplinary research environment at the Life Science Centre with modern infrastructure and consolidated human resources ;
• Development of structural, computational and cell biology research programmes to tackle complex biological systems related to disease mechanisms;
• Combination of microfluidics, next generation sequencing, single molecule/cell and gene technologies for development of novel diagnostic tools and therapies;
• Increased possibilities to internationalise the research environment and reverse brain-drain;
• Increased Integration into European Research Area;
• Central role in implementation of priorities of Research and Innovation Strategy for Smart Specialization in Lithuania;
• Strengthening links with biotech industry through implementation of joint projects.

813 Weaknesses

• Limited access to emerging new technologies (lack of certain skills and access to facilities);
• Lacking National membership in major European life science organisations (EMBC/EMBO and EMBL, etc.);
• Marginal interactions with research teams within EU in research training and technological exchange;
• Insufficient internationalisation of research environment: small number of international students, post-docs and researchers;
• Insufficient exposure of junior personnel (PhD students and postdocs) to cutting-edge research environment;
• Lack of experienced international project managers.

814 Threats

• Slow economic growth (nationally and the whole EU) and insufficient funding;
• Worsening demographicsituation: decreasing number of students, including PhD and post-docs;
• Limited and insufficient access to cutting edge technologies;
• Lack of coherent national strategy for attracting young research leaders and for introducing cutting edge research directions;
• Excessive bureaucracy in R&Dmanagement by major national funding agencies (Science Council of Lithuania and The Agency for Science, Innovation and Technology);
• Loss of competitiveness due to excessively rigid and drawn-out public procurement procedures applied to research projects;
• Ineffectiveness of central administration of Vilnius University in managing organizational and project-related issues.

8.2. Evaluate the Unit in relation to its leading scientific competitors

821 How does the Unit perceive itself in the international context?

University Institute of Biotechnology (VU_IBT) has been active in the field of molecular biotechnology for the past 40 years. During this time, VU_IBT became a recognized leader in life science both nationally and in Central and Eastern European Countries (CEEC). The Institute provides an interface between advanced education, basic research and technological development for the economic and social benefit of Lithuania and the European Union. VU_IBT is internationally acclaimed for its multidisciplinary research of structure and function of restriction-modification enzymes, CRISPR-Cas systems, development of biomedical recombinant proteins, small molecule inhibitors and bioinformatics. The highest level of research performed at VU_IBT in all these areas is attested by successful participation in EU FP and other competitive programmes, scientific publications in top-tier journals, and highest citation figures among Lithuanian research institutions. In addition to fundamental research, IBT has a strong applied research component documented by European/US patents and successful spin-off companies. Recently, VU_IBT took a leadership in coordinating X-ray structural studies in Baltic countries (Lithuania, Latvia and Estonia) by assembling and submitting BioStruct-X BAG proposal “Structural biomedical research in Baltics”. VU_IBT also plays a leading role in the development and support of the Crystallography Open Database (http://www.crystallography.net/), which is becoming an important international

822 What is the “niche” of the Unit in the global research environment?

VU_IBT is known internationally for its multidisciplinary research on nucleic acid enzymes/technologies, recombinant proteins and bioinformatics. VU_IBT strength lies in a proper balance between basic and applied research and strong links with biotech industry. Much of the basic research done at this institute is of outstanding quality and competes internationally as can be judged from publications in the high-rank journals. Importantly, VU_IBT has a significant success in commercialization of its research products. Nucleic acid technologies developed by VU_IBT scientists were successfully licensed to large multinational companies (Thermo Fisher and others).The Institute provides an interface between advanced education, basic research and technological development and serves as bridge to the biotech industry.

823 What characteristic features distinguish the Unit from its international competitors?

Structural studies performed at VU_IBT produced nearly 1/3 (~ 20 in total) of all known crystal structures of restriction enzymes. Unique expertise of VU_IBT scientists was critical in the development of the Crystallography Open Database (COD) that is widely accepted by the research community. Expertise of VU_IBT scientists in nucleic acid enzymes was instrumental in the discovery of the Cas9 enzyme used for genome editing and development of new tools for epigenome analysis. Both technologies were successfully licensed to large multinational companies. VU_IBT bioinformaticians are known internationally for their expertise in protein structural bioinformatics and development of

methods for prediction and evaluation of protein structure. The bioinformatics team (IBT_LT) came first in the category of homology modeling at 2008 world-wide CASP structure prediction competition outperforming top groups from USA and Europe. VU_IBT and a private capital contributed recently to the establishment of the Sector of Microtechnologies. Such partnership is still unique in Lithuania life science sector. Novel approaches in the drug design employing correlations between the chemical and crystallographic structure, and thermodynamics led to rationally design and synthesis of ~750 compounds with inhibitory properties. Research in the field of recombinant proteins and antibodies produced the impressive collection of recombinant viral proteins and monoclonal antibodies for molecular diagnostics.

824 What are the most relevant competitors (university departments or other research institutions) of the Unit in the international context?

The regional international competitors of VU_IBT are research institutes and universities active in the life science field in neighbouring Baltic countries and Poland, including Estonian Biocentrehttp://vvv.ebc.ee/ in Tartu, Latvian Biomedical Research and Study Centre (http://biomed.lu.lv/en/) in Riga and also Polish research institutions, e.g., The International Institute of Molecular and Cell Biology (http://www.iimcb.gov.pl/ in Warsaw.
At the individual group level, VU_IBT researchers at the Department of Protein-DNA interactions successfully compete in the international context with leading universities including University of California, Berkley, MIT Broad Institute and others (Bloomberg Life Sciences Law & Industry Report – March 2014). Furthermore, researchers of the Department of Biological DNA Modification successfully compete for grants from the National Institutes of Health (NIHUSA) in the field of molecular tools for epigenome analysis. Researchers of the Department of Bioinformatics compete with a number of top structural bioinformatics teams worldwide.

825 What are the main channels through which the Unit interacts with the international scientific community?

VU_IBT interacts with the international scientific community using the following main channels:

• Scientific publications in the internationally acclaimed journals (including top-rate Nature and Cell group journals);
• Scientific conferences and symposia;
• Workshops and training courses;
• International collaborative grants (EC FP-7, NIH) and COST actions;
• Collaborative R&D projects with industrial partners (Thermo Fisher Scientific Baltics, Abcam, Euroimmune, Microimmune, Johnson&Johnson, Medix, ArkDia, Santa Cruz);
• ScanBalt programme (Baltic sea region-wide development of strategies and participation in the projects for close transnational collaboration in biomedical research and innovation);
• Joint EU research programmes: a joint project application together with Lithuanian University of Health and Kaunas Technology University, Lund University, Karolinska Institute (Sweden) and VTI (Finland) has been submitted for Teaming programme of HORIZON2020

826 Are the professors and leading researchers at the Unit active in international learned societies etc.?

Dr. D. Matulis has been the member of the American Chemical Society and the Biophysical Society (US) since 1996. Dr. D. Matulis has been invited to serve for the Committee of International relations for the Biophysical Society. He is currently the President-elect for the Lithuanian Biochemical Society and the Secretary of Lithuanian Biophysical Society. He is the Lithuanian representative to ScanBalt since 2005. Prof. S. Klimašauskas is a member of the Epigenetics Society, the American Chemical Society, International Union of Crystallography and the European Society of Human Genetics.

827 What are the most relevant research projects the Unit has been engaged in during the assessment period jointly with other universities / research institutes in Lithuania or abroad?

Most relevant projects of VU_IBT with the institutions abroad are as follow below:
• FP7 MoBiLi, Nr. 145721
• FP7 FLUINHIBIT, Nr. 201634
• FP7 METOXIA, Nr. 222741
• FP7 Tb Pan Net, Nr. 223681
• FP7 FLUCURE, Nr. 259972
• FP7 MC CIG, Nr. 293476
• FP7 BioCellChip, Nr. 300121
• NIH 2 projects (USA)
For details see p. 6.2.

828 Has the Unit been the main organizer of major international conferences? Please explain

Prof. V. Siksnys has been a co-organizer of the FASEB summer research conference on Nucleic Acids Enzymes, Saxtons River VT, U.S.A. (2010).
Dr. D. Matulis organized the Second Central and Eastern European Conference on Thermal Analysis and Calorimetry in Vilnius (2013). The meeting attracted over 310 international participants. He also organized a local COST MC meeting in Vilnius (2013) that attracted over 100 international participants.
Prof. S. Klimašauskas, has been a session co-organizer, 3rd European Conference on Chemistry for Life Sciences: “Linking Chemistry with Biological Activity”, Frankfurt am Main, Germany (2009)

8.2.9. List min 3 of your leading scientific competitors

Name of competitor (unit)	Country	Reason why listed
Estonian Biocentre	Estonia	Competition for international funding and students
Latvian Biomedical Research and Study Centre	Latvia	Competition for international funding and students
The International Institute of Molecular and Cell Biology	Poland	Competition for international funding and students

8.3. The Unit's research strategy (relation to the state'/parent organisation's strategy, research priority areas, development measures, performance indicators)

Describe the Unit's research programme for the next 5 years, the key research objectives and means to achieve these objectives. What is the role of basic and applied research? Is there a need for new knowledge, facilities; is the present level of funding sufficient for attaining the objectives laid down? Do the strategies of the Unit and the State support each other? How do you take into account the possible ethical questions within research?

831 What are the key research objectives and means to achieve these objectives.

The underlying principle of sustainable research development of the IBT has been to capitalize on most successful and productive research themes and use it as grounds for expanding to new cutting-edge areas. VU_IBT research programme for the next 5 years foresees two key areas of research activities that are coherent with Lithuania priority area "Molecular technologies for medicine and biopharmacy" formulated for Strategies for Smart Specialization:
1. "Protein structure, interactions and cellular networks". A vast experience in structural and computational studies of nucleic acid enzymes, CRISPR-Cas antiviral defense systems and recombinant proteins along with recent addition of plant signaling and amyloid research components provide a strong basis for expanding the research focus into more complex biological systems and to tackle emerging biomedical problems. The synergy between experimental and computational research is expected to strongly stimulate structural biology research at IBT
2. "Cellular imaging and high-throughput approaches to study human disease" involves studies and development of recombinant therapeutic proteins, novel immunodiagnostics, and design of drug-like active compounds.Based on mechanistic studies of DNA methyltransferases and CRISPR systems novel DNA/RNA labeling and editing techniques and high throughput genome technologies will be developed for applications in molecular diagnostics.

832 What is the role of basic and applied research in UoA research strategy?

Basic and applied research at IBT is tightly intertwined and usually complements each other. The major focus of research activities at IBT is the generation of new knowledge in the broadly defined field of molecular biotechnology leading to publications in international peer-reviewed journals. This activity is supported via state funding and research granting agencies. Tackling important basic biological questions often produces results that are of interest to biotech industry. For example, recent studies of bacterial defence mechanisms against bacteriophages led to development of novel genome editing tools, which were patented and successfully licensed to a major international company. Similarly basic research on DNA methylation unveiled a new biopolymer labelling technology leading to patenting and licensing to a major international company. A fraction of our research efforts is devoted to applied contract research for biotech companies (e.g., production of new antibodies), which is largely supported by the industrial partners and the Agency For Science, Innovation And Technology.

833 Is there a need for new knowledge, facilities? Please describe.

The realisation of the IBT research strategy for the next 5 years will require both an acquisition of new equipment/facilities and new competences. Our basic funding (state subsidy, research grants and industry contracts) is sufficient for maintaining day-to-day research activities of the Institute, but fall short to support our expansion to new areas of research, both in terms of equipment and scientific knowledge. Therefore additional dedicated funding is needed both for the acquisition of new equipment and hiring of young talents that could bring desired expertise to the IBT. However, currently no such funding is available. Our concrete plans for bringing new scientific competence to the IBT are following:
1. To establish an international chair position (1-2 annually) for 3-5 years to attract group leaders with expertise in the designated priority areas (cellular imaging, cell biology, single cell/molecule analysis, systems biology, genome informatics).
2. Establish strong ties with 2-3 research groups abroad who are recognized leaders in the priority fields (twinning/ virtual labs programme).

834 Is the present level of funding sufficient for attaining the objectives laid down? Please describe.

According to the Lithuania legislation, 50% of national research institution funding (State subsidy) is fixed and the rest 50% increment depends on scientific results and activity of researchers. In 2013 the state funding comprised 23% of total IBT budget. The main financial sources of the VU_IBT were different national and international grants and collaborative projects with industry. We are continuously striving to improve the financial positions of the IBT by participating in various tenders for grants. In 2011-2013periodannualfinancialgrowthaccounted for about40%. In the context of Lithuania, the funding of VU_IBT was rather good, however, in the international context and in comparison to industry, the funding was low and non competitive with old members of ERA. In conclusion, our basic funding (state subsidy, research grants and industry contracts) is sufficient for maintaining day-to-day research activities of the Institute, but falls short in supporting our expansion to new areas of research, both in terms of equipment and scientific knowledge.

835 Do the strategies of the State and the Institution/Unit support each other? Please describe.

The strategy of the Institute is in line with the government's strategy. The Lithuanian government identified biotechnology as one of the strategic RTD areas that have a potential to develop to a decisive share of the future knowledge based economy. To foster the development of biotechnology, the Lithuanian government approved the National Integrated Programme "Biotechnology and Biopharmacy" linked to the financial planning of EU structural funds. The government also approved the Concept of Integrated Science, Studies and Business Centers (Valleys), later developed to the Valleys Development Programme to be funded from EU structural funds. Biotechnology was identified as one of priority of smart specialization for the 2014-2020 financing period.
According to this Valleys Development Programme, at 2015 the VU_IBT will be incorporated into the Life Science Centre located at the Santara Valley one of the key initiatives of the city of Vilnius seeking to become the knowledge based city of the international level. The existing academic potential will be accumulated and the cooperation between science, studies and business will be increased significantly. The main research and business fields will include biotechnology and molecular medicine. The Santara Valley mission is to promote the development of knowledge-based economy and modern health care in Lithuania mobilizing academic, scientific, innovative business and health care potential

836 How do you take into account the possible ethical questions within research?

All our biomedical projects that involve collection and investigation of human specimens requirean approval of the Lithuanian Bioethics Committee. These projects are performed in collaboration with clinical partners (Vilnius University Santariskiu Clinics, Vilnius University Children Hospital, the Institute of Oncology) that are responsible for providing human biological material. Therefore, the proposals to the Lithuanian Bioethics Committee are submitted together with our clinical partners and the approvals to perform the collaborative biomedical research are issued both to the clinical partner and the VU-IBT.
All our projects involving the use of experimental animals are performed in collaboration with the Centre for Innovative Medicine that has a license for breeding of experimental animals obtained from the State Food and Veterinary Service of the Republic of Lithuania (license number 0103). All procedures involving experimental animals are performed in accordance with the Lithuanian and European legislation (Law on the Care, Keeping and Use of Animals of the Republic of Lithuania, No VIII-500; EEC directive 86/609) under controlled laboratory conditions by personnel who have obtained FELASA certificates.

8.4. The societal impact of the Unit's activities

Describe here how the Unit's research activities and cooperation with other actors in society have promoted the activities of other societal actors, e.g. industry of SMEs. What are the main channels through which the Unit interacts with the society at large?

841 Describe here how the Unit's research activities and cooperation with other organizations have promoted the activities of other societal actors, e.g. industry or SMEs.

Almost all modern biotech industry of Lithuania bears roots from IBT, including Thermo Fisher Scientific Baltics (former UAB Fermentas), Sicor-Biotech Teva (former UAB Biofa), UAB Biocentras. In recent years, the IBT researches cofounded five spin-off SMEs. A substantial fraction of our former Master students and Ph.D graduates are employed by the companies.
Researchers of the VU_IBT founded the Lithuanian Biotechnology Association (LBTA). LBTA coordinates the collaboration between Lithuanian biotechnology enterprises and research institutions. IBT together with LBTA has prepared a Programme of Industrial Biotechnology that encouraged development of industrial biotechnology(White Biotechnology) in Lithuania.
IBT researchers are active members of Lithuania Biochemical Society and Dr.Matulis currently act as a President-elect of the society. VU_IBT researchers currently are actively lobbying for Lithuania membership in EMBC/EMBO and EMBL.
IBT scientists actively collaborate with secondary schools in establishing "Biotechnology clusters" and schoolchildren training for participation in international biology competitions. IBT researches also served as experts in the development of priorities for the Smart Specialization Initiative for Lithuania.
Leading VU_IBT researchers are involved in activities of the Lithuanian Academy of Sciences, which provides a national interface for fostering Biological and Natural Sciences in the Society and among the young generation.

842 What are the most important research projects the Unit has carried out with non-university / research institutes partners from the public or private sector during the assessment period?

1. The research agreements and license agreements with international company Thermo Fisher Scientific Baltics (Vilnius);
2. The research agreement and license agreement with international company Pioneer (USA);
3. Research agreement with Abcam Ltd (GB);
4. Research agreement with Johson&Johnson (USA);
5. Partnership with private funds in establishment of the Sector of Microtechnologies at IBT;
6. Agreement with ArcDia International Ltd, Turku (Finland);
7. Crystallography Open Database (COD) project.

843 Has the research of the Unit produced spin-off companies? Please explain.

Almost all modern biotechnological industry of Lithuania derived from IBT, including Thermo Fisher Scientific Baltics (former UAB Fermentas, 1995), Sicor-Biotech Teva (former UAB Biofa, 1995), UAB Biocentras (1991). In recent years, the research staff of VU_IBT established five SMEs: UAB Profarma (2007), UAB Nomads (2010), UAB Baltymas (2011), UAB IMD technologies (2012), UAB Diagnolita (2013).

844 Are the members of research active staff preferred experts also outside the academic research field? Please explain.

Researchers of the VU_IBT founded the Lithuanian Biotechnology Association (LBTA). The Association coordinates the collaboration between Lithuanian biotechnology enterprises and research institutions. VU_IBT together with LBTA and Ministry of Economy has prepared a Programme of Industrial Biotechnology, which was carried out in 2007-2010 and 2011-2013. This programme encouraged development of industrial biotechnology(white biotechnology) in Lithuania.
VU_IBT scientists actively collaborate with secondary schools and help to organize biotechnology clusters in the schools.VU_IBT also contributed to the organization of biotechnology classrooms in many secondary schools of Lithuania. VU_IBT researchers take the lead in schoolchildren training for participation in international biology competitions. VU_IBT researchers also served as experts in the development of priorities for smart specialization initiative for Lithuania.

8.5. Assess the Unit's research infrastructure

	Staff of the unit	Other users of institution	Outside user
8.5.1. Real time PCR amplifier ROTORGENE 6000,5 channel	yes	yes	yes
8.5.1. Electrophoresis system WITAVISION i2D 225	yes	yes	yes
8.5.1. Bioanalyzer 2100	yes	no	no
8.5.1. Inverted microscope NIKON Eclipse Ti-U	yes	yes	yes
8.5.1 Cryostat Cryostream -700	yes	yes	no
8.5.1. Liquid chromatography system, fractions collector, laptop	yes	yes	no
8.5.1. Centrifuge HiCenSR	yes	yes	yes
8.5.1. Mar 180 X-Ray detector	yes	no	no
8.5.1. Crystallography system	yes	yes	no
8.5.1. X-RAY difractometer	yes	no	no
8.5.1. AKTA PRIME PLUS EXCL REC chromatography system	yes	yes	yes
8.5.1. AKTA PRIME PLUS EXCL REC chromatography system	yes	yes	yes
8.5.1. Protein crystallization robot ORYX8	yes	yes	no
8.5.1. AKTA FPLC chromatography system	yes	yes	yes
8.5.1. High pressure liquid chromatography system	yes	yes	yes
8.5.1. Spectrofluorimeter FLOROMAX 3	yes	yes	yes
8.5.1. High pressure liquid chromatography system AKTA EXPLORER 100 Ai	yes	yes	yes
8.5.1. Circular dichroism (CD) spectrometer J-815	yes	yes	yes
8.5.1. Difractometer RIGAKU, source MICROMAX TM-007	yes	no	no
8.5.1. Computer INDIGO 2 XL, GRAPHICS	yes	yes	no
8.5.1. Mass spectrometer HEWLETT PACKARD	yes	no	no
8.5.1. Chromatography system HPLC SYSTEM, HEWLETT PACKARD	yes	yes	yes
8.5.1. Liquid chromatography system	yes	yes	yes
8.5.1. DNA chip analyser	yes	yes	yes
8.5.1. DNA spotter QARRAY	yes	no	no
8.5.1. Centrifuge AVANTI J-301, 230 V	yes	yes	yes
8.5.1. RQF-3 pulsed quench-flow apparatus	yes	yes	no
8.5.1. Spectrometer	yes	yes	yes
8.5.1. LUV/VIS spectrophotometer	yes	yes	yes
8.5.1. Real time thermocycler	yes	yes	yes
8.5.1 .Capilliary electophoresis analyser with laser induced fluorescence detection	yes	no	no
8.5.1. Liquid chromatography /mass spectrometry AGILENT 6520 Q-TOF system	yes	yes	no
8.5.1. Ultracentrifuge L-8-70	yes	yes	yes
8.5.1. Ultracentrifuge OPTIMA LE-80K	yes	yes	yes
8.5.1. Genetic analyzer 3130, 2 computers	yes	no	no
8.5.1. Chromatography system AKTA prime	yes	yes	yes
8.5.1. Liophylizer LABCONCO, 230V 50 Hz	yes	yes	yes
8.5.1. Chromatography system AKTA PRIME PLUS EXCL REC	yes	yes	yes
8.5.1. Fermenter LABFORS 3; 7,5 l	yes	yes	no

8.5.1. Fermenter BIOSTAT A PLUS	yes	yes	no
8.5.1. Analytical high pressure liquid chromatography system AGILEnt 120	yes	yes	no
8.5.1. Homogenizer APV-2000	yes	yes	yes
8.5.1. Isoelectric focusing -non-equilibriums pH gradient electrophoresis system	yes	yes	yes
8.5.1. High pressure liquid chromatography system GE Healthcare AKTAp	yes	yes	yes
8.5.1. LS-50B spectrofluorometer	yes	yes	yes
8.5.1. Horticultural thermostat MC 1000 E, SNIJDERS	yes	yes	yes
8.5.1. Ultracentrifuge OPTIMA L-90K	yes	yes	yes
8.5.1. Horizontal atoclave FOB2S	yes	no	no
8.5.1.Tangential flow filtration system	yes	yes	yes
8.5.1.Transmission electron microscope	yes	yes	no
8.5.1 Multimode microplate reader INFINITE 200M TECAN	yes	yes	yes
8.5.1. Isothermal titration calorimeter	yes	yes	yes
8.5.1. Fluorometer CARY ECLIPSE BIOMELT-all, compurter	yes	yes	yes
8.5.1. Isothermal titration calorimeter MICROCAL ITC 200, computer and software	yes	yes	yes
8.5.1. Gas chromatography system SHIMADZU GC2010, su priedais	yes	yes	yes
8.5.1. Microscope OLYMPUS IX70,digital image camera	yes	yes	yes
8.5.1. Universal fluorescent image analyser FUJI FLA 5100	yes	yes	yes
8.5.1 Flow cytometer CyFLOW SPACE	yes	yes	no
8.5.1. Computer TEZRO TOWER, 2 x 700 MHz, R16K/ 4MB	yes	yes	no
8.5.1. Computer system SILICON GRAPHICS FUEL V12	yes	yes	no
8.5.1. Computer cluster	yes	yes	yes
8.5.1. High performing computing Linux cluster	yes	yes	yes
8.5.2. Academic Search Complete (2009-2013)	yes	yes	yes
8.5.2. Access Medicine (2013)	yes	yes	yes
8.5.2. ACM Digital Library (2011-2013)	yes	yes	yes
8.5.2. American Chemical Society (2009-2013)	yes	yes	yes
8.5.2. American Institute of Physics (2009-2013)	yes	yes	yes
8.5.2. American Physical Society (2009-2013)	yes	yes	yes
8.5.2. Annual Reviews (2009-2013)	yes	yes	yes
8.5.2. Annual Reviews archive (2011-2013)	yes	yes	yes
8.5.2. BMJ Clinical Evidence (2010-2012)	yes	yes	yes
8.5.2. BMJ Journals (2012-2013)	yes	yes	yes
8.5.2. Business Source Complete (2009-2013)	yes	yes	yes
8.5.2. Central & Eastern European Academic Source (2010-2013)	yes	yes	yes
8.5.2. Chandos Publishing e-Books (2013)	yes	yes	yes
8.5.2. Cochrane Library (2009-2013)	yes	yes	yes
8.5.2. Computers & Applied Sciences Complete (2009-2012)	yes	yes	yes
8.5.2. eBooks on EBSCOhost (2012-2013)	yes	yes	yes
8.5.2. eBooks on ScienceDirect (2013)	yes	yes	yes
8.5.2. Ebrary (2009-2013)	yes	yes	yes
8.5.2. EconLIT with FT (2009-2013)	yes	yes	yes
8.5.2. EDP Sciences (2009-2013)	yes	yes	yes
8.5.2. Emerald Backfiles (2010-2013)	yes	yes	yes
8.5.2. Emerald Management eJournals Collection (2009-2013)	yes	yes	yes
8.5.2. ERIC (2009-2013)	yes	yes	yes
8.5.2. GreenFILE (2009-2013)	yes	yes	yes
8.5.2. Grove Art Online (2009-2013)	yes	yes	yes
8.5.2. Grove Music Online (2009-2013)	yes	yes	yes
8.5.2. Health Source - Consumer Edition (2009-2013)	yes	yes	yes

8.5.2. Health Source: Nursing/Academic Edition (2009-2013)	yes	yes	yes
8.5.2. Humanities International Complete (2009-2013)	yes	yes	yes
8.5.2. IEEE/IET Electronic Library (2009-2013)	yes	yes	yes
8.5.2. IOP Publishing Archive collection 1874-1999 (2011-2013)	yes	yes	yes
8.5.2. IOPscience EXTRA (2009-2013)	yes	yes	yes
8.5.2. Journal Citation Reports (2009-2013)	yes	yes	yes
8.5.2. JSTOR (2010-2013)	yes	yes	yes
8.5.2. Library, Information Science & Technology Abstracts (2009-2013)	yes	yes	yes
8.5.2. Lippincott Williams & Wilkins Custom (2009-2013)	yes	yes	yes
8.5.2. Literary Reference Center (2009-2013)	yes	yes	yes
8.5.2. MasterFILE Premier (2009-2013)	yes	yes	yes
8.5.2. MD Consult (2010-2012)	yes	yes	yes
8.5.2. MEDLINE (2009-2013)	yes	yes	yes
8.5.2. Nature Publishing (2010-2013)	yes	yes	yes
8.5.2. Newspaper Source (2009-2013)	yes	yes	yes
8.5.2. Oxford Journals Online (2012-2013)	yes	yes	yes
8.5.2. Oxford Reference Online (2009-2013)	yes	yes	yes
8.5.2. Passport GMID (2010-2013)	yes	yes	yes
8.5.2. SAGE Journals Online (2009-2013)	yes	yes	yes
8.5.2. Science Classic Archive (2011-2013)	yes	yes	yes
8.5.2. Science Online (2012-2013)	yes	yes	yes
8.5.2. SciVerce (Science Direct) (2009-2013)	yes	yes	yes
8.5.2. SocINDEX with full-text (2009-2013)	yes	yes	yes
8.5.2. SPIE Digital Library e-Books (2010-2013)	yes	yes	yes
8.5.2. Springer LINK (2009-2013)	yes	yes	yes
8.5.2. Springer LINK Archive (2011-2013)	yes	yes	yes
8.5.2. SpringerLINK E-Books (2009-2013)	yes	yes	yes
8.5.2. Taylor and Francis (2011-2013)	yes	yes	yes
8.5.2. The Biomedical & Life Sciences Collection (2011-2013)	yes	yes	yes
8.5.2. Web of Science (2009-2013)	yes	yes	yes
8.5.2. Wiley Online Library (2009-2013)	yes	yes	yes
8.5.3. Crystallography open database	yes	yes	yes

8.5.4. Assess the Unit's research infrastructure

Describe the use and availability of research infrastructure (including research equipment, computer resources, libraries or databases, databanks, material collections, archives, research management, support services and technical staff). In "Users" indicate use and availability of infrastructure both for staff of the Unit and for outside users

Research infrastructure of VU_IBT with the exception of equipment which requires special knowledge and qualification to perform experiments is available forall permanent staff and other users of the institutions, i.e. doctoral students, B.Sc. students, M.Sc. students and outside users.

The VU_IBT is operating on the principle of open access for both internal and external users: research facilities, resources and services are open to all local, regional, national and international researchers and businesses who are interested in. The staff of the institute provides below named service:

- DNA sequencing;
- Protein X-Ray crystallography;
- Computational methods for sequence comparison, protein structure prediction and assessment of protein structure quality;
- Analysis of genomes and proteomes;
- Proteome analysis by mass spectrometry, protein molecular weight determination;
- Development and production of monoclonal antibodies;
- Generation of recombinant proteins in yeast and bacteria

9. FUNDING

9.1. The Unit's funding for research activities

(in thous. €)

	2011	2012	2013
Total	**2197**	**2935**	**4445**
911 State budget appropriations for R&D	**733**	**806**	**959**
9111 Basic funding for R&D activities	722,3	796,5	943,8
9112 Basic funding for administration and other needs	10,4	9,2	15,3
912 Competitive R&D funding (State Budget) (excluding 9.1.4)	**840**	**1702**	**2337**
9121 Top down R&D programmes projects funded by Research Council of Lithuania	123,0	151,4	230,1
9122 Bottom up R&D programmes funding (Researcher teams, Proof of Concept, Global grant projects)	508,4	924,8	1310,8
9123 National programmes projects funded by other state agencies	208,7	626,0	796,4
913 International R&D programmes funding	**283**	**107**	**855**
9131 Framework Programmes	238,0	104,8	536,2
9132 ERA NET, Joint research, Joint iniciative projects (Bonus, EuroNanoMed 2, Cultural Heritage)	0,0	0,0	0,0
9133 Intergovernmental cooperation programmes projects (including Lithuanian – Swiss programme)	44,7	2,0	318,7
9134 International programmes (Eureka, Eurostars, etc.) projects funded by other state agencies	0,0	0,0	0,0
914 Funding for support activities	**9**	**29**	**33**
9141 Funding received for scientific events	0,0	0,0	5,3
9142 Funding for research visits	7,1	6,1	1,9
9143 Funding for short-term visits of researchers	0,0	0,0	0,5
9144 Support for students' research activities	1,9	21,4	23,9
9145 Support for publication of research results	0,0	1,7	1,0
915 Funding from national industry	**54**	**87**	**70**
	54,4	87,1	69,9
916 Funding from abroad industry	**42**	**57**	**45**
	42,0	56,7	44,7
917 Other not above stated R&D funding	**236**	**147**	**147**
	236,3	146,8	146,9

9.2. Characterise the international competitiveness of the Unit in research for attracting the funding

	Project acronime	Execution time	Funding received (without national contribution, thous. €)
9.2.1. EU Framework Program projects	A multidisciplinary approach to the study of DNA enzymes down to the single molecule level.	2005-2009	165,4
9.2.1. EU Framework Program projects	Development of novel antiviral drugs agaisnt influenza (FLUCURE)	2010-2013	120,0
9.2.1. EU Framework Program projects	Towards construction of a comprehensive map of amyloid-ligand interactions: (-)-Epigallocatechin 3-Gallate and insulin amyloid (EGCG+insulin=)	2011-2015	100,0
9.2.1. EU Framework Program projects	Strengthening and Sustaining the European Perspectives of Molecular Biotechnology in Lithuania (MoBiLi)	2009-2013	1603,8
9.2.1. EU Framework Program projects	Metastatic tumours facilitated by hypoxic tumour micro-environments (METOXIA)	2009-2014	174,8
9.2.1. EU Framework Program projects	Pan-European Network For The Study And Clinical Management Of Drug Resistant Tuberculosis (TB PAN-NET)	2009-2014	65,3
9.2.1. EU Framework Program projects	Small molecule inhibitors of the trimeric influenza virus polymerase complex (FLUINHIBIT)	2008-2010	185,3

9.2.2. Other international projects	COST FA0605 "Signaling control of stress tolerance and production of stress protective compounds in plants"	2007-2011	#Error
9.2.2. Other international projects	EEA: Anticancer drug design by structural biothermodynamics	2008-2010	565,0
9.2.2. Other international projects	NIH: Aapproaches for genomic mapping of 5-Hydroxymethylcytosine, a novel epigenetic mark in mammalian DNA, NIH	2010-2012	222,1
9.2.2. Other international projects	HHMI:Structural characterization of protein interactions in DNA replication, repair and recombination processes through molecular modelling.	2006-2010	374,7
9.2.2. Other international projects	NIH:Methylome profiling via DNA Methyltransferase directed labelling	2008-2010	86,0
9.2.2. Other international projects	NIH grant: Direct single nucleotide mapping of genomic CpG marks	2013-2015	103,9
9.2.2. Other international projects	New methods for DNA cytosine modification analysis and application in medicial diagnostics Lithuania-France bilateral program	2011-2012	#Error
9.2.2. Other international projects	SWISS-LT:Directed Evolution of computer engineered enzymes using based microfluidics	2012-2016	412,4
9.2.2. Other international projects	Baltic Sea Health Region – Business Acceleration Support and Training Bridging Innovative SMEs and Health Care Organisations to Strenghten BSR Health Economy / BSHR HealthPort (HealthPort)	2012	94,3
9.2.2. Other international projects	Role of small non-coding RNA in Lactoccocus lactis defense system. Lithuania-France bilateral program	2013-2014	#Error
9.2.2. Other international projects	SWISS-LT:Signalling control of pathogen induced plant immunity	2013-2016	384,2
9.2.2. Other international projects	Hypoxia sensing, signalling and adaptation (COST TD0901)	2009-2013	#Error
9.2.2. Other international projects	Epigenetics: Bench to Bedside (COST TD0905)	2010-2014	#Error
9.2.2. Other international projects	Chemical Biology with Natural Products (COST CM0804)	2009-2013	#Error
9.2.2. Other international projects	Cancer and Control of Genomic Integrity (CANGENIN) (COST BM0703)	2008-2012	#Error

9.3. Characterise the potential contribution of the Unit in economical development – the orientation to commercialization of the research and implementation of the results of

	Project acronime	Execution time	Funding received (without national contribution, thous. €)
9.3.1. Market-oriented research projects	Detection of pathogenic beta-amiloid oligomers in Alzheimer's disease (AMILOIDE)	2008-2010	22,9
9.3.1. Market-oriented research projects	Development of humanized Yeast expression system by using proteomic approach and gene engineering	2008-2010	198,2
9.3.1. Market-oriented research projects	Deveopment of new tools for improved lanoratory diagnosis of human papilomavirus (HPV) infection and HPV related cancer HPV diagnostics	2008-2010	147,7
9.3.1. Market-oriented research projects	Development and evaluation of biodegradable esthers of controlled flammability and resistant to aging	2008-2010	66,2
9.3.1. Market-oriented research projects	Development of anti-cytolysin monoclonal antibodies designed to neutralize the toxic cytolysin of the pathogenic bacteria	2008-2010	251,9
9.3.1. Market-oriented research projects	Development of new tools for Merkel cell polyoma virus	2009-2010	92,4
9.3.1. Market-oriented research projects	Development of innovative biotechnology for oil base lubricant productioni (BIOLUBRICANT)	2012-2013	21,1
9.3.1. Market-oriented research projects	Development of microfluidics technology for monodisperse vesicles production and improved drug delivery. uVESICLES	2012-2013	147,4
9.3.1. Market-oriented research projects	Development of innovative biocatalytic stain remover (FASTREMOVE)	2012-2013	105,3

9.3.3. Contract research	Analysis of enzyme additive activity and stability in potassium soaps	2010	3,5
9.3.3. Contract research	R&D and analysis	2010	3,5
9.3.3. Contract research	Generation of recombinant nucleocapsid proteins of Puumala,Dobrava, Hantaan hantavirus	2010-2013	18,8
9.3.3. Contract research	Generation of recombinant hantavirus proteins for diagnostics	2010	31,8
9.3.3. Contract research	Generation of monoclonal antibodies	2010-2013	3,7
9.3.3. Contract research	Studies on hydrolysis of wheat starch to maltose syrups and large scale trials	2010	8,0
9.3.3. Contract research	Analysis of genomic 5-hydroxymethylcytosine	2011	35,0
9.3.3. Contract research	Studies on DNA and hybrid meganuclease interaction	2010	17,5
9.3.3. Contract research	Generation of viral recombinant proteins	2009-2013	48,9
9.3.3. Contract research	Generation of monoclonal antibodies	2009-2013	101,7
9.3.3. Contract research	License agreement	2011-2013	25,0
9.3.3. Contract research	HPLC-MS analysis of probes	2012-2013	4,7
9.3.3. Contract research	Studies on functional activity of in vivo programmable meganuclease CAS 9	2012-2013	47,3
9.3.3. Contract research	Development of neutralizing antibodies against DNA polymerase	2012	21,0
9.3.3. Contract research	License agreement:DNA methylation analysis	2012-2013	36,3
9.3.3. Contract research	License agreement: DNA methylation profile	2012-2013	48,4
9.3.3. Contract research	Development, purification and characterization of monoclonal antibodies against next generation DNA polymerases	2013	26,3
9.3.3. Contract research	Improvement of detergent formulations using more efficient and viable materials with purpose to reduce environmental degradation and the use of resource	2013	3,4
9.3.3. Contract research	Synthesis of SAM analogue	2013	5,3
9.3.3. Contract research	Quality analysis of PET flakes	2011	3,5
9.3.3. Contract research	Enzymatic synthesis of degradable esters in continuous reactors	2011	7,0
9.3.3. Contract research	Analysis quality and thermostability of polymer products	2011	3,5

9.4. Evaluate the role of different funding sources (State and different funding organisations) in promoting the scientific and societal impact of research

Main funding sources are as follows:

1. State subsidy.
2. Foreign research grants: EC-FP, National Institutes of Health USA, Howard Hughes Medical Institute USA
3. National research grants: largely administrated by the Lithuanian Research Council (Research group grants, Global grants, etc.)
4. National technology development and infrastructure grants: administered by the Ministry of Education and Science and the Ministry of Economy, Agency for Science, Innovation and Technology, National Integrated Programme, Joint Research Programmes)
5. Contracts/collaborative grants with industry partners.
6. Private funds.

In 2013, the State subsidy comprised 23% of the total budget of VU_IBT. The state subsidy of VU_IBT depends on the scientific results and activity of research staff. Indicators of scientific activity such as publications in high-impact journals, patents, international grants and contracts with industry contribute to the increase of the state subsidy as these indicators are included into the evaluation of the scientific excellence of research institutions.

Other financing (~75 % of the 2013 budget) comes from outside sources such as national and international grants and collaborative projects with industry, European Structural Funds. We are continuously striving to improve the financial positions of the VU_IBT by participating in various programmes and tenders for grants. During the period of 2011-2013, the total annual budget at VU_IBT increased about30% from 2,188 MEuros in 2011 to 3,13 MEuros in 2013. In the context of Lithuania, the funding of VU_IBT is rather good, however, in the international context and in comparison to industry, the funding is low and non competitive in ERA.

The increase of fundinghad a significant impact on theq uality of scientific results. In recent years,researchers of the institute published more publications in high-ranking international scientific journals as compared to the previous periods. Improved quality and relevance of research had greatly encouraged patenting and licensing activities. In 2013, researchers of the institute filed 7internationalpatent applications and sold licenses to foreign companies worth more than M$ 1.00. Noteworthy, patenting activities were supported by dedicated funding from the Agency for Science, Innovation and Technology. This altogether promoted the creation of new spin-off companies. In the 2011-2013period, 3 new SMEs were established by the researchers of VU_IBT which added 8 new job positions in the biotech sector.

9.5. Describe in not more than one page what the group would do with an increase of 25 percent in institutional funding.

One of the biggest challenges faced by the Institute is internationalization of research environment and attracting and retaining the best young research talent. To address this challenge we would allocate 25% of the increased Institutional funding to launch Advanced Investigator and Young Leader Chairs programme at the Institute. This programme would aim to attract experienced researchers and young investigators with a high level of ability and proven research experience in the designated priority areas by offering them the opportunity to set up an independent research teams at the Institute. Projects submitted should be innovative and bring new expertise and cutting-edge technologies to the Institute. This programme would enhance the Institute's position, visibility and competitiveness in the global environment.

VU_IBT has recently gained experience in international recruiting through the FP7 project "MoBiLi" (2010-2013). In the framework of this project, IBT recruited three scientists that have established independent research groups and brought expertise in microfluidics, plant molecular biology and amyloid research. New groups leaders were very successful in attracting additional funding from international and national research programmes that exceeded by 640% the expenses of recruitment. On the other hand, the programme revealed several problems faced during the international recruitment of scientists. First, the salary level offered by the programme (which was determined based on the national salary level) was substantially lower than that in the developed European and North America countries. Second, no re-location and set-up costs were envisioned in the programme. Therefore, in the framework of "MoBiLi" project we were able to recruit only scientists of Lithuanian origin who spent significant periods of time abroad but still maintained links with the local research environment. Therefore, to attract experienced researchers and young investigators on a truly international basis, the proposed Advanced Investigator and Young leader Chairs programme should include personnel costs on a competitive international level, a relocation allowance and an adequate research start-up package.