Curriculum vitae

My research lies at the crossroad of molecular biology, biophysics and genetics - for want of better identified as 'molecular cell biology'. I have been working on the architecture of eukaryotic chromatin focusing on molecular mechanisms that drive DNA recombination events. Since my PhD fellowship (and later as a faculty member of the Dept. of Biophysics and Cell Biology) I have addressed central problems of genome instability: key findings include *(1)* the discovery of persistent single-stranded DNA breaks in genomic regions that are prone to rearrangements in human malignancies, *(2)* the discovery of ribonucleoportein particles (RNA-DNA hybrids) in the proximity of these nicks. The latter finding was published as a *track II* paper in the ***Proceedings of the National Academy of Sciences of USA***, which allowed me to establish fruitful collaborations involving leading experts in the field; e.g. Caroline Austin (Newcastle University, UK) who is an expert of topoisomerases (co-author in one of my papers) and the world-class yeast geneticist Alain Nicolas (Institut Curie, Paris) who then became my post-doc supervisor. A major strand of my work involves molecular knowledge on the developmentally (genetically) programmed DNA double-strand breaks (DSBs): I have been studying DSB formation during the differentiation program of meiosis in *S cerevisiae*. After 5 years of intense workload, together with the Nicolas group (Paris) and the group of Vincent Géli (Marseille) we found a cause-effect relationship between meiotic DSBs and the presence of an epigenetic tag, H3K4me3. This breakthrough - providing a definitive and unexpected explanation for the link between H3 lysine4 methylation and recombination – was published in ***Science*** (as joint-first author with Laurent Acquaviva, CRCM, Marseille) and it was highlighted in *Nature Reviews Mol Cell Biol* and in *Molecular Cell*. Importantly, a chief part of these experiments was carried out in my host institute at Hungary (funded from Hungarian sources), after my return from France in 2010; hence the University of Debrecen was fully affiliated in this publication. In 2015 I won the excellence grant of the Hungarian Academy of Sciences, called Momentum, and currently I am a group leader in the MTA-DE Momentum Genome Architecture and Recombination Research Group.

- **PERSONAL INFORMATION**

Family name, First name: SZÉKVÖLGYI, Lóránt (1977)
Web sites: http://geneart.med.unideb.hu/ ; http://rcmm.med.unideb.hu/
Tel.:+36 52 411 717/ 50230; Fax: +36 52 255 990

- **EDUCATION**

2008-2010	Post-doc (Alain Nicolas lab, Institut Curie, Paris, France)
2007	Ph.D. (Theoretical medicine, chromatin structure), University of Debrecen/ Hungary Supervisor: Gábor Szabó (Dept. of Biophysics and Cell Biology)
2002	M.Sc. /molecular biology, biochemistry/ University of Debrecen/ Hungary

- **POSITIONS**

2015 –	Group leader The Hungarian Academy of Sciences
2015 –	Senior lecturer Department of Biochemistry and Molecular Biology, University of Debrecen, Hungary
2014 –	Principal investigator (Genome architecture and recombination group) Research Centre for Molecular Medicine, Debrecen, Hungary
2013 –	Senior lecturer Department of Biophysics and Cell Biology, University of Debrecen, Hungary
2007 – 2013	Assistant lecturer Department of Biophysics and Cell Biology, University of Debrecen, Hungary

- **FELLOWSHIPS AND GRANTS**

2016	IMéRA/Inserm research fellowship / Institut d'études avancées, France; Role: visiting scientist, The Cancer Research Centre of Marseille (CRCM)
2016-2018	NKFIH-ERC_15 Research Grant / National Research, Development and Innovation Office; Sum: 145k EUR. Role: PI.

2015-2020 Momentum Research Grant / The Hungarian Academy of Sciences; Sum: 726k EUR. Role: PI. Host: Research Centre for Molecular Medicine/ University of Debrecen

2014 – 2016 CRP-ICGEB International Research Grant / Trieste, Italy „Structural examination of histone mutations driving human disease" Sum: 48k EUR Role: PI. Host: Dept. of Biophysics and Cell Biology/ University of Debrecen

2013 – 2014 Zoltán Magyary Postdoctoral Fellowship in the Convergence Regions / Hungary Sum 17k EUR

2012 – 2016 EU-FP7 Marie Curie European Carrier Integration Grant „Global analysis of R-loop structures (RNA-DNA hybrids) by advanced microscopic and genetic approaches" (acronym: GLORI) Sum: 100k EUR. Host: Dept. of Biophysics and Cell Biology/ University of Debrecen

2011 – 2014 OTKA-PD Research Grant „Cell biophysical and genetic analysis of higher-order chromatin organization and genetic recombination in the model organism *Saccharomyces cerevisiae*" Sum: 87k EUR. Role: PI. Host institute: Dept. of Biophysics and Cell Biology/ University of Debrecen, Hungary

2008 – 2010 EU-FP7 Marie Curie intra-European Fellowship Host: Institut Curie, Paris, France (Recombination and Genome Instability Unit / PI: Alain Nicolas) "Establishing the meiotic recombination initiation epigenetic code in the yeast *Saccharomyces cerevisiae*" (acronym: EMRES) Sum: 177k EUR

2006 EMBO short-term Fellowship (3 Months) Host: Institut Curie, Paris, France (Recombination and Genome Instability Unit / PI: Alain Nicolas)

- **MAJOR COLLABORATIONS**

Topic 1: Epigenetic regulation of meiotic recombination
[1] Alain Nicolas (Inst. Curie, Paris, France); *[2]* Vincent Géli (Cancer Research Centre of Marseilles, France); *[3]* Jennifer C. Fung (UCSF School of Medicine, San Francisco, CA)

Topic 2: Biophysical analysis of mutant histones driving human disease
[5] Jörg Langowski (DKFZ, Heidelberg); *[6]* Katalin Tóth (DKFZ, Heidelberg)

- **ORGANISATION OF SCIENTIFIC MEETINGS**

2014 **Danube Scientific Conferences on Epigenetics (2014 Nov 19-21st , Budapest, Hungary)** Speaker. Co-organizer with Bálint Bálint (Debrecen, Hungary), Tamás Arányi (Budapest, Hunagry), Wendy Bickmore (MRC, UK), Imre Boros (Szeged, Hungary), László Nagy (Sanford Burnham, FL, US), Iannis Talianidis (Fleming Institute, Athens, Greece), László Tora (IGBMC, Strasbourg, France) http://danube-epigenetics.weebly.com/

2013 **23rd Wilhelm Bernhard Workshop on the Cell Nucleus (19-24th Aug 2013, Debrecen, Hungary).** Speaker. Co-organizer with Gábor Szabó (Debrecen, Hungary). http://wbw23.unideb.hu/main.htm

- **SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS**

I have been member and accredited Ph.D. supervisor of the Doctoral School of Molecular Cell Biology and Immunbiology since 2010. http://molcellimm.phd.med.unideb.hu/index.html

Ph.D. students: (3) András Szántó 2012–**,** Szabolcs Hetey 2013–**,** László Halász 2013–

M.Sc. students: (3) Szabolcs Hetey 2010-2013 (defended in 2013 with excellent)**;**
Zsófia Budai 2013-**;** David Lee 2013-
B.Sc. students: (3) Gábor Hajnal-Papp 2007-2010 (defended in 2010 with excellent)
Zsófia Budai 2011-2013 (defended in 2013 with excellent); Nóra Kányási 2011-

- **TEACHING ACTIVITIES**

My teaching activity has been carried out at the Dept. of Biophysics and Cell Biology/ Faculty of Medicine/ University of Debrecen. I have given lectures, seminars and practices (in Hungarian and English) for Hungarian and foreigner students:

Lectures:

2007-	Biophysics for MD- molecular biologist- and pharmacologist students (atomic physics, radioactivity, X-ray/CT/PET/SPECT/MRI, ultrasound, lasers)
2007-	Cell biology for MD- molecular biologist- and pharmacologist students (chromatin structure, cell cycle, meiosis)
2011-	Modern biophysical methods (fluorescent techniques, FRET, FRAP, FCS)
2011-	Selected topics in cell biology (title: "Recombination: break the genome to save it!")
2011-	Physics for physiotherapeutic students (electricity, nuclear physics)

Seminars 2004-: Cell biology, Biophysics, Physics, Biostatistics
Practices 2002-: Cell biology, Biophysics

- **INSTITUTIONAL RESPONSIBILITIES**

2007 –	Faculty Committee Member / Dept. of Biophysics and Cell Biology/ University of Debrecen
2010–	Faculty Coordinator of Cell Biological practices / Dept. of Biophysics and Cell Biology/ University of Debrecen
2010 –	Ph.D. supervisor and Scientific adviser / Doctoral School of Molecular Cell Biology and Immunbiology / Hungary
2011–	Faculty Coordinator of the elective course "Modern biophysical methods" / Dept. of Biophysics and Cell Biology/ University of Debrecen
2014 –	Faculty Coordinator / Students' Research Society for Medical and Health Sciences/ University of Debrecen

- **MEMBERSHIPS OF SCIENTIFIC SOCIETIES**

2003 –	Member / Hungarian Biophysical Society (MBFT)
2008 –	Public Body Member / Hungarian Academy of Sciences
2014 –	Member / Hungarian Biochemical Society (MBKE)
2014 –	Member / Hungarian Genetic Society (MAGE)

- **PUBLICATIONS**

1. **Szekvolgyi L***, Ohta K, Nicolas A* Histone Modifications and Chromatin Remodeling: Impact on the initiation of Meiotic Homologous Recombination
CSH PERSPECT BIOL (2015) *** joint-corresponding authors**

2. Acquaviva L*, **Szekvolgyi L***, Dichtl B, Dichtl BS, Saint Andre CD, Nicolas A, Géli V The COMPASS Subunit Spp1 Links Histone Methylation to Initiation of Meiotic Recombination
SCIENCE 339:(6116) pp. 215-218. (2013) *** joint-first authors**

3. **Szekvolgyi L**, Nicolas A From meiosis to postmeiotic events: Homologous recombination is obligatory but flexible
FEBS JOURNAL 277:(3) pp. 571-589. (2010)

4. **Szekvolgyi L**, Imre L, Minh DXQ, Hegedus E, Bacso Z, Szabo G Flow Cytometric and Laser Scanning Microscopic Approaches in Epigenetics Research.
METHODS IN MOLECULAR BIOLOGY HumanaPress, 2009. pp.99-112.

5. **Szekvolgyi L**, Fenyofalvi G, Bacso Z, Szabo G Chromatin loops stepping from R-loops
CELLULAR ONCOLOGY 31:(2) pp. 142-143. (2009)

6. Máthé C, Beyer D, Erdődi F, Serfőző Z, **Székvölgyi L**, Vasas G, M-Hamvas M, Jámbrik K, Gonda S, Kiss A, M. Szigeti Z, Surányi G Microcystin-LR induces abnormal root development by altering microtubule organization in tissue-cultured common reed (Phragmites australis) plantlets
AQUATIC TOXICOLOGY 92:(3) pp. 122-130. (2009)

7. Hegedus E, Kokai E, Vereb G, Bacso Z, **Szekvolgyi L**, Dombradi V, Szabo G Mapping the arrangement of nicks marking loop-size domains in yeast chromatin
CELLULAR ONCOLOGY 31:(2) pp. 143-144. (2009)

8. Hegedus E, Imre L, Pataki J, Lizanecz E, **Szekvolgyi L**, Fazakas F, Bacso Z, Toth A, Szabo M, Seres Z, Szabo G Heteroduplex analysis using flow cytometric microbead assays to detect deletions, insertions, and single-strand lesions
CYTOMETRY PART A 73A:(3) pp. 238-245. (2008)

9. **Szekvolgyi L**, Rakosy Z, Balint LB, Kokai E, Imre L, Vereb G, Bacso Z, Goda K, Varga S, Balazs M, Dombradi V, Nagy L, Szabo G Ribonucleoprotein-masked nicks at 50-kbp intervals in the eukaryotic genomic DNA
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 104:(38) pp. 14964-14969. (2007)

10. **Szekvolgyi L**, Hegedus E, Molnar M, Bacso Z, Szarka K, Beck Z, Dombradi V, Austin C, Szabo G Nick-forming sequences may be involved in the organization of eukaryotic chromatin into ~50 kbp loops
HISTOCHEMISTRY AND CELL BIOLOGY 125:(1-2) pp. 63-73. (2006)

11. **Szekvolgyi L**, Balint L B, Imre L, Goda K, Szabo M, Nagy L, Szabo G ChIP-on-beads: Flow-cytometric evaluation of chromatin immunoprecipitation
CYTOMETRY PART A 69A:(10) pp. 1086-1091. (2006)

12. Pataki J, Szabo M, Lantos E, **Szekvolgyi L**, Molnar M, Hegedus E, Bacso Z, Kappelmayer J, Lustyik G, Szabo G Biological microbeads for flow-cytometric immunoassays, enzyme titrations, and quantitative PCR
CYTOMETRY PART A 68A:(1) pp. 45-52. (2005)
13. Szabo G, Lustyik G, Pataki J, Szabo M, **Szekvolgyi L**, Hegedus E, Fazekas F Fixed cells as microbeads for various applications ***CYTOMETRY 59A***:(1) p. 154. (2004)

14. Szilagyi I, Varga T, **Szekvolgyi L**, Hegedus T, Goda K, Kaczur V, Bacso Z, Nakayama Y, Posafi J, Pongor S, Szabo G Non-random features of loop-size chromatin fragmentation
JOURNAL OF CELLULAR BIOCHEMISTRY 89:(6) 1193-1205. (2003)

- **INVITED PRESENTATIONS AT CONFERENCES AND SEMINARS**

2015.
6th Central European Genome stability and Dynamics Meeting (9 – 10th October 2015), Biological Research Centre, Szeged, HUNGARY. Invited speaker.

XIV. "Genetikai Műhelyek Magyarországon" Minikonferencia. 2015. szeptember 4, SZBK, Szeged. Meghívott előadó.

24th Wilhelm Bernhard Workshop on the Cell Nucleus (17-22th August, Wien, Austria). Invited speaker.

EMBO Meiosis conference (30. August-04. September 2015, Oxford, UK). Poster presentation.

MBKE Epigenetikai Szakosztály alakuló ülés (2015.04.16., Budapest). Meghívott előadó.

Hungarian Molecular Life Sciences Conference (27-29th March 2015, Eger, Hungary). Invited speaker.

2014.
Danube Scientific Conferences on Epigenetics (Nov 20-22nd 2014, Budapest). Co-organizer, speaker.

5th Central European DNA Repair Meeting (Oct 10th 2014, Brno, Czech Republic. Invited speaker.

Annual meeting of the Hungarian Biochemical Society. Invited Speaker. (24-27th August, Debrecen, Hungary)

BRC Seminars (21st Jan. 2014, BRC Szeged, Hungary). Invited speaker.

2013.
4th Central European DNA Repair Meeting (Nov 8th 2013, Wien, Austria). Invited speaker.

4th Congress – Personalized Medicine in the mirror of interdisciplinarity (Sept. 6-7th 2013, Eger, Hungary) Invited speaker.

23rd Wilhelm Bernhard Workshop on the Cell Nucleus (19-24th August, Debrecen, Hungary) Co-organizer, speaker.

Hungarian Molecular Life Sciences Conference (Apr 5-7th 2013, Siófok, Hungary). Speaker.

2012.
Three dimensional genome organization seminar (Apr. 16th 2012, DKFZ, Heidelberg). Invited speaker.

1st Hungarian Epigenetic Conference - basic science and clinical applications (20-21st Sept. 2012, Budapest, Hungary). Invited speaker. Best short-talk price.

2011.
IX. Magyar Genetikai Kongresszus és XVI. Sejt- és Fejlődésbiológiai Napok (March 25-27th 2011, Siófok, Hungary). Invited speaker.