Curriculum vitae

Name: Nikolett Zsibrita

Place and date of birth: Kiskunfélegyháza, March 8, 1991

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Nationality: Hungarian

EDUCATION

2017 -	PhD, Doctoral School of Biology, University of Szeged (Hungary)
2013 – 2017	M.Sc. in Plant Biotechnology (Agricultural Biotechnology) Szent István University, Gödöllő (Hungary)
2009 – 2013	B.Sc. in Bioengineering, University of Szeged (Hungary)

RESEARCH EXPERIENCE

Period	2013 –
Institue	Institute of Biochemistry, Biological Research Centre, Eötvös Loránd Research Network
Supervisior	Antal Kiss

Topics

- New approaches to the method of targeted DNA methylation
- Sensitivity of certain restriction endonucleases to hemimethylation of their substrate sites
- Developing techniques for studying sequence-specific DNA-protein interations in *Escherichia coli*

LANGUAGE KNOWLEDGE

English	C1
German	B1

CONFERENCE ATTENDANCE

2021	10th Jubilee Interdisciplinary Doctoral Conference, Pécs
2019	6th International Synthetic & Systems Biology Summer School, Pisa
2019	Hungarian Molecular Life Science Conference, Eger
2017	XXXIII. National Scientific Students' Associations Conference, Mosonmagyaróvár
2016	Anual Scientific Students' Associations Conference, SZIE MKK, Gödöllő

AWARDS AND SCHOLARSHIPS

2021	Best presentation award, 10th Jubilee Interdisciplinary Doctoral Conference
2021	„Best Scientific Publication" I. prize, 2021, BRC „Qualitas Biologica" Foundation
2020-2024	Young Investigator Grant of the Eötvös Loránd Research Network
2020-2021	Straub Young Scientist Prize
2017-2018	Ph.D. scholarship of the BRC
2016	Special Award of the Doctoral and Habilitation Council Szent István University, Faculty of Agriculture and Environmental Sciences, Scientific Students' Conference, Genetics and Biotechnology Section

PUBLICATIONS

2021	K. Ślaska-Kiss[#], N. Zsibrita[#], M. Koncz, P. Albert, Á. Csábrádi, S. Szentes, A. Kiss: Lowering DNA binding affinity of SssI DNA methyltransferase does not enhance the specificity of targeted DNA methylation in E. coli. Scientific Reports, 2021, 11(1):15226
2020	S. Szentes[#], N. Zsibrita[#], M. Koncz, E. Zsigmond, P. Salamon, Z. Pletl, A. Kiss: I-Block: a simple Escherichia coli-based assay for studying sequence-specific DNA binding of proteins. Nucleic Acids Research, 2020, 48(5):e28
2018	P. Albert, B. Varga , N. Zsibrita, A. Kiss - Circularly permuted variants of two CG: specific prokaryotic DNA methyltransferases. PLOS ONE, 2018, 13(5):e0197232

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PRESENTATIONS

2021	Nikolett Zsibrita - I-Block: A simple assay for studying sequence-specific DNA-protein interactions in *E.coli* 10th Jubilee Interdisciplinary Doctoral Conference, Pécs
2017	Zsibrita Nikolett: Új megközelítések az irányított DNS metiláció módszerének javításához XXXIII. National Scientific Students' Associations Conference, Mosonmagyaróvár
2016	Zsibrita Nikolett: Új megközelítések az irányított DNS metiláció módszerének javításához Annual Scientific Students' Associations Conference, SZIE MKK, Gödöllő

POSTERS

2019	N. Zsibrita; S. Szentes; A. Kiss - I-Block: A simple *E. coli-based* assay for studying sequence-specific DNA-binding of proteins 6th International Synthetic & Systems Biology Summer School, Pisa
2019	N. Zsibrita; S. Szentes; A. Kiss: A simple *E. coli* system for studying sequence-specific DNA binding of proteins Hungarian Molecular Life Sciences, Eger

RESEARCH INTEREST

I joined the DNA-Protein Interactions Group of the Biological Research Center (BRC) after getting my Bachelor's degree in bioengineering. During my work in the BRC I continued my studies as a corresponding student to get my Master's degree in agricultural biotechnology. At the beginning of my work, I took part in a project, which investigated how sequence specificity of the *in vivo* method of targeted DNA methylation depends on the DNA binding affinity of the methyltransferase. In my first independent project, I studied how hemimethylation of the recognition site affects activity of the restriction endonucleases, which we used for the detection of targeted DNA methylation. The results of this work were presented at the Scientific Students' Associations Conference.

For targeting methylation to specific sites we used two zinc-finger proteins, whose recognition sequences were known from previous *in vitro* work. Although the experimental system was quite simple, we could not detect targeted DNA methylation. We hypothesized that the zinc fingers bound worse to their target sites in *E. coli* than could be expected from previous *in vitro* data.

There were techniques available to investigate sequence-specific DNA-protein binding in *E. coli*, but these methods seemed, mainly because of the requirement for protein fusions, unnecessarily complicated to answer such simple question. We decided to develop a simple method, which is suitable to detect whether a protein can bind to a certain DNA sequence in *E. coli*. This project became my Ph.D. work. The method we have developed works by detecting competition between the protein of interest and RNA polymerase for binding to overlapping target sites in a plasmid-borne *lacI* promoter variant, thus binding of the tested protein shuts off transcription of the *lacI* gene. Because of its working mechanism, the method is called I-Block assay. The use of the I-Block assay requires only standard molecular biology expertise and laboratory equipment.

The method is, in its current state, suitable to analyze just a small number of protein-DNA combinations at the same time. We wish to develop the assay into a high-throughput technique, which can be used to find the best binding site from a random sequence library, or to select the best binding protein for a certain DNA sequence.