Curriculum vitae

Personal information:

Name:	**János Pálinkás**
Date of Birth:	27th December 1995
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Contact Address:	1117 Budapest, Pázmány Péter sétány 1/C ELTE TTK Department of Biochemistry

Studies:

2020-	PhD Student, Eötvös Loránd University (ELTE) Faculty of Science, Doctoral School of Biology, Structural Biochemistry Programme
2018-2020	Eötvös Loránd University Faculty of Science, Biology MSc, Specialisation of Molecular, Immune- and Microbiology
2014-2018	Eötvös Loránd University Faculty of Science, Biology BSc
2008-2014	Katona József High School, Kecskemét

Professional experience:

February 2017 - ELTE Department of Biochemistry, Motor Enzymology Research Group:

Investigation of liquid-liquid phase separation by bacterial single stranded DNA-binding protein in vitro (Harami et al., 2020., PNAS).

Investigation of liquid-liquid phase separation by human single stranded DNA-binding proteins with in vitro and in vivo fluorescence microscopy (ongoing project)

Investigation of the domain-dependent activities of RecQ helicases during homologous recombination with transient enzyme kinetic method; comparison of bacterial and human RecQ helicases (Harami et al., 2022., Nature Communications).

Fields of research:

biochemistry, molecular biology, biophysics, molecular motors, DNA-helicases, enzymology, enzyme kinetics, protein-protein interactions, immuncytochemistry, phase separation, biological condensates, fluorescent microscopy

Research interest:

The integrity of our genome is essential for maintaining cell function. Errors in our DNA are repaired by evolutionarily conserved, strictly regulated mechanisms. The motor protein family of RecQ

helicases play highly important roles in the control and regulation of homologous recombination-dependent repair of double stranded DNA-breaks. During my research I investigated and compared the activities of bacterial and human RecQ helicases. Together with my supervisor we established a transient enzyme kinetic method based on the detection of a fluorescent substrate, which we used to determine the activities of RecQ helicases with analytical accuracy. I successfully uncovered essential differences between bacterial and human RecQ helicases. Our results were published in a paper this February by *Nature Communcations,* in which I am listed as a co-first author.

During my research, I also investigated another fundamentally important protein in DNA-metabolism: the bacterial *(E. coli)* single stranded DNA-binding protein (SSB). The main function of this protein is the protection of single stranded DNA during several processess in DNA-metabolism (replication, transcription, repair), and the recruitment of other proteins to the site of work via specific protein-protein interactions. Our group demonstrated that *E. coli* SSB is able to form dynamic condensates under physiological conditions through a process called liquid-liquid phase separation. Interaction partners of SSB and their substrates are able to enrich inside these droplets, suggesting that these SSB condensates can act as central organizers of bacterial genome maintenance and together with their content they can readily be deployed to the site of work. Our results were published in October 2020 by *Proceedings of the National Academy of Sciences*. Currently I am conducting further research regarding the bacterial and human SSB proteins, which are proposed to undergo liquid-liquid phase separation as well; however, its role is currently unknown.

Publications:

Phase separation by ssDNA binding protein controlled via protein−protein and protein−DNA interactions
Gábor M. Harami, Zoltán J. Kovács, Rita Pancsa, **János Pálinkás**, Veronika Baráth, Krisztián Tárnok, András Málnási-Csizmadia, Mihály Kovács
Proceedings of the National Academy of Sciences Oct 2020, 117 (42) 26206-26217; DOI: 10.1073/pnas.2000761117

The toposiomerase IIIalpha-RMI1-RMI2 complex orients human Bloom's syndrome helicase for efficient disruption of D-loops
Gábor M. Harami*, **János Pálinkás***, Yeonee Seol, Zoltán J. Kovács, Máté Gyimesi, Hajnalka Harami-Papp, Keir C. Neuman, and Mihály Kovács
***authors contributed equally**

Publications under review:

The human WRNIP1 protein regulates G4 replication in a Pif1-dependent manner
Szilvia Juhász, Ágnes Tóth, Gábor M. Harami, **János Pálinkás**, Lili Hegedűs, Enikő Sajben-Nagy, Szabolcs Bene, Lajos Pintér, Lajos Haracska, Mihály Kovács, Péter Burkovics

Scholarships:

2019/20 school year — New National Excellence Programme (ÚNKP), Research Scholarship for Masters Students:
Role of RecQ helicases in the pathway selection of homologous recombination

Conferences:

- ELTE Biology Student Conference (TDK), 2017 – **presentation**
- Human BLM helicase maintains balance between D-loop disruption and stabilization (9th Central European Genome Stability and Dynamics Meeting, 2018, Warsaw) - **poster**
- Novel assay resolves D-loop processing pathways by *E. coli* RecQ and human BLM helicases (63rd Annual Meeting of the Biophysical Society, Baltimore, Maryland, 2-6 March 2019) - **poster**
- ELTE Biololgy Student Conference, 2019 - **presentation**
- XXXIV National Student Conference, Section of Biology, 2019 - **presentation**

Awards & prizes:

- II. place, ELTE Biology Student Conference (TDK), 2017
- Certificate of Outstanding Achievements in Student Conferences, 2018, ELTE TTK
- Special Award, XXXIV National Student Conference, Section of Biology, 2019
- Excellent Student of ELTE Faculty of Science, 2020

Other professional activities:

2015-2017	ELTE Biology Student Conferences, Member of the organizing team

Language skills:

German	Intermediate level, complex, 2013 ECL
English	Daily use, intermediate level knowledge

11th April 2022, Budapest