

**Recruitment for the Poznań Doctoral School of the Institutes of the Polish Academy of Sciences
at the Institute of Bioorganic Chemistry, PAS in Poznań
Procedure no. 23/2022/ICHB/PSD**

INSTITUTION: Institute of Bioorganic Chemistry, PAS
CITY: Poznań
POSITION: PhD student
POSITIONS AVAILABLE: 1
SCIENTIFIC DISCIPLINE: biological sciences / chemical sciences and related
PUBLICATION DATE: 24.06.2022
APPLICATION DEADLINE: 31.07.2022
IBCH PAS WEBSITE: <https://portal.ibch.poznan.pl/homepage/>
PDS IPAS WEBSITE: http://www.psd-ipan.ibch.poznan.pl/?page_id=355&lang=en

KEY WORDS: RNA, thermodynamics of nucleic acids, secondary structure mapping of RNA, natural and viral RNAs

Research topic: the research concerns the determination of the thermodynamic rules of natural RNA folding in cellular-like conditions and the implementation of the obtained thermodynamic parameters into the RNAstructure program. This program is used to predict RNA folding based on thermodynamic rules. The next step is to compare the structures of the influenza RNA experimentally determined in cellular-like conditions with the structure of the same RNA generated with the RNAstructure program.

Principal Investigator: prof. dr hab. Ryszard Kierzek

I. Project description

The correlations of RNA structure and function are very well known. In order to change the biological functions of RNA, including pathogenic human RNA, it is necessary to know the structure of native RNAs. RNA secondary structure determination is relatively straightforward for RNA in vitro and relies on chemical, enzymatic and microarray mappings as well as RNA structure determination using thermodynamic rules. RNA secondary structure folding is based on the nearest-neighbor model and uses thermodynamic parameters for duplexes and nonhelical RNA structural motifs determined in a buffer containing 1M sodium chloride. Determining the RNA structure in the cellular environment (in vivo, in cellulo) is a difficult and long-lasting process and is currently based mainly on chemical mapping in cells and analysis of mapping results using next generation sequencing (NGS) methods. The overall aim of the project is to study the rules of RNA folding in cells to be able to bioinformatically correctly predict native RNA structures. In the presented project, we propose:

(1) determination of the thermodynamic parameters of RNA folding in in vivo-like conditions to predict RNA folding under native conditions. To achieve this goal, we will determine the thermodynamic stability of model RNAs in a cellular-like buffer.

(2) implementation of the cell thermodynamics parameters into RNAstructure. This will allow to determine RNA folding in the cellular environment and compare the thermodynamic stability and RNA structure in vitro and in cellular conditions,

(3) compare the folding of the same RNAs determined by the *cellular* RNAstructure and the structure determined by RNA mapping using the NGS method. In this group of studies, we will especially focus on segment 8 of the influenza virus vRNA (vRNA8).

Additional information:

1. Research and doctoral theses shall be carried out within the project Opus (2019/33/B/ST4/01422) "Thermodynamic parameters and rules of RNA folding in cellular conditions (in vivo-like). RNA fold prediction for a better understanding of their structure and function in mammalian cells" financed by the National Science Center.
2. PhD students shall receive a stipend in the gross amount of ca 4300 PLN (3800 PLN net), for the period of 18 months with possible extension
3. PhD students shall be subject to social insurance, pursuant to article. 6 section 1 passage 7b of the act of October 13th, 1998 on the social insurance system (Journal of Laws of 2019, item 300, 303 and 730).

II. Requirements for the candidates:

1. MSc degree in biological sciences (biology, molecular biology, biotechnology) or chemical sciences or related sciences or fulfilling the conditions stipulated in article 186, section 2 of the act of July 20th, 2018 Law on Higher Education and Science (Journal of Laws of 2018, item 1668, as amended); BSc degree holders can also apply but will need to obtain their MSc title before they start working in the project. The competition is also open to persons who will obtain a master's degree by August 15, 2022.
2. Knowledge of molecular biology or chemistry or virology techniques.
3. Very good command of English.
4. Basic knowledge in the topics related with project.
5. Very high motivation for further development and ability to work in a team.

III. Duties in project:

1. Investigation of the thermodynamic stability of model RNA duplexes in a cellular-like buffer.
2. Studies of the thermodynamic stability of model RNA duplexes containing nonhelical RNA structural motifs.
3. Chemical mapping of RNA secondary structure in vitro.

IV. Required documents:

1. Application for admission to PDS IPAS along with the consent for processing personal data upon the recruitment procedure and a statement on having acknowledged the regulations of recruitment for PDS IPAS, using form downloaded from http://www.psd-ipan.ibch.poznan.pl/wp-content/uploads/2021/10/ICHBApplication_for_admission_202110.docx
2. Certified copy of the diploma confirming graduation or a certificate confirming graduation (in the case of diplomas issued by foreign higher education schools, diploma stipulated in article 326, section 2, passage 2 or article 327, passage 2 of the act of July 20th, 2018 – Law on Higher Education and Science (Journal of Laws of 2018, item 1668, as amended), entitling to apply for conferment of a doctoral degree in the state in where such a certificate was issued by the relevant higher education school. In the event when the candidate is not in possession of the aforementioned documents, he/she is obliged to submit them prior to admission to PDS IPAS. Additional information on foreign school diplomas are available at: <https://nawa.gov.pl/en/recognition/recognition-for-academic-purposes/applying-for-admission-to-doctoral-studies>
3. Scientific CV encompassing track record of previous education and employment, information on involvement in scientific activities (participation in student research groups, attendance at scientific conferences, accomplished internships and training, awarded prizes and distinction) and list of publications.
4. Cover letter featuring a short description of research interests, achievements and justification for the intention to commence education at the doctoral school.
5. Certificates or other documents confirming the degree of proficiency in English, if the candidate is in possession of such materials.
6. Contact details of at least one, previous scientific supervisor or another researcher who is entitled to issue an opinion on the candidate.

V. Applications should be submitted via the eRecruiter portal at

<https://system.erecruiter.pl/FormTemplates/RecruitmentForm.aspx?WebID=23893c7fa1234718adaeaffdd492a073>

VI. Submission deadline is **31.07.2022**

VII. Criteria for evaluation of candidates:

1. Candidate's research achievements, pursuant to the grades obtained in the course of studies, scientific publications, awarded scholarships and distinctions resulting from conducting scientific research or student activities or other achievements.
2. Candidate's scientific and professional experience, pursuant to participation in conferences, workshops, training sessions and internships, implementation of research and commercial projects, involvement in scientific trusts and societies, international and professional mobility, experience in other sectors, including industry.
3. Candidate's knowledge on the following discipline: biological sciences or chemical sciences.
4. Knowledge of the subject matter described in the recruitment advertisement.

VIII. The recruitment procedure shall be concluded no later than **30.08.2022**

IX. The description of the recruitment process is stipulated in the Regulations of Recruitment for PDS IPAS. Following the recruitment procedure, the unadmitted candidates shall be informed on the number of points obtained at both stages.

Incomplete applications will not be considered.

For additional information please contact the Principal Investigator:

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Information clause:

Pursuant to the stipulations of the regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), further referred to as GDPR, we hereby inform that:

- *The Institute of Bioorganic Chemistry, Polish Academy of Sciences, seated in Noskowskiego St. 12/14, 61-704 Poznan; REGON 000849327, NIP 777-00-02-062 is the administrator of the collected personal data (further referred to as the Institute).*
- *The Administrator appointed a Data Protection Officer, who can be contacted in writing, via traditional mail, by sending a letter to the following address: Z. Noskowskiego St. 12/14, 61-704 Poznan, or by sending an e-mail to: dpo@ibch.poznan.pl.*
- *The personal data of the candidates is processed for the purposes of fulfilling the tasks of the administrator, associated with conducting the recruitment procedure for a vacant position.*
- *The legal basis for processing personal data is the Act of 26 June 1974 – The Labor Code, Act of 30 April 2010 on the Polish Academy of Sciences or the consent of the person whose data shall be subjected to processing.*
- *Your personal data shall be subjected to processing for period of 3 months upon the date of decision of the recruitment committee. Following this period, the data will be irretrievably and effectively destroyed.*
- *The personal data of the candidates shall not be transferred to any third country.*
- *The person whose data shall be subjected to processing has the right to:*
 - *request access to his/her personal data, and to amend it or delete it, pursuant to articles 15-17 of GDPR;*
 - *limit data processing, in the events stipulated in article 18 of GDPR;*

- *data transferring, pursuant to article 20 of GDPR;*
- *withdraw consent at any moment, without influencing compliance with the law of the processing that was executed prior to consent withdrawal;*
- *file a complaint to the Inspector General for Personal Data Protection.*

Providing personal data in the scope stipulated in article 22 (1) of the Act of 26 June 1974 – The Labor Code is mandatory, whereas providing data in a broader scope is voluntary and requires consent for its processing.