INSTITUTE OF BIOORGANIC CHEMISTRY
Polish Academy of Sciences

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Recruitment for the Poznań Doctoral School of the Institutes of the Polish Academy of Sciences at the Institute of Bioorganic Chemistry, PAS in Poznan
Procedure no. 11/2022/ICHB/PSD

INSTITUTION:	Institute of Bioorganic Chemistry, PAS
CITY:	Poznan
POSITION:	PhD student
POSITIONS AVAILABLE:	1
SCIENTIFIC DISCIPLINE:	Biological sciences
PUBLICATION DATE:	02.03.2022.
APPLICATION DEADLINE:	15.04.2022.
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: nucleic acid binding proteins, protein-nucleic acid interactions, Dicer ribonuclease, G-quadruplexes, regulatory RNAs, regulation of gene expression

Principal Investigator: Assoc. Prof. Anna Kurzynska-Kokorniak, PhD, DSc

Research topic: functional implications of interactions between the ribonuclease Dicer and DNA/RNA molecules adopting the G-quadruplex structures

I. Project description

Accumulating evidence indicates that DNA/RNA G-quadruplexes (helical structures containing guanine tetrads) serve important regulatory roles in fundamental biological processes such as DNA replication, transcription, and translation, while aberrant G-quadruplex formation is linked to genome instability and cancer. Understanding the biological functions played by G-quadruplexes requires detailed knowledge of their protein interactome. Our newest finding indicates that ribonuclease Dicer – the enzyme known from its important role in the miRNA/siRNA biogenesis pathways, apart from its canonical substrates (pre-microRNAs and double-stranded RNAs) may as well bind G-quadruplex structures present within RNA and DNA molecules (doi: 10.1007/s00018-021-03795-w). Planned research focuses mainly on the human Dicer (hDicer). During the project implementation, we would like to answer the following questions:

- What are the potential functional implications of *in cellulo* interactions between hDicer and RNA molecules adopting the G-quadruplex structures?

- Whether nuclear hDicer can bind to the telomeric G-quadruplex structures, and other G-quadruplex structures formed within chromatin? If yes, what are the potential functional implications of these interactions?

Using the developed cell models, immunoprecipitation techniques and next-generation sequencing (NGS), we plan to identify and then characterize the pool of cellular DNA and RNA adopting G-quadruplex structures bound by hDicer. To prove that hDicer binds to the G-quadruplex structures in the cell, we will apply Forster Resonance Energy Transfer (FRET)-based assays. Moreover, imaging co-localization experiments will be performed with the MINFLUX nanoscope, a newest technology which enables not only an identification of the interaction and the distance between the two targets, but also allows for unambiguous verification whether the two targets are next to each other, and hence whether they indeed interact. Based on the all collected data, the potential functional implications of Dicer's interactions with the DNA and RNA molecules adopting G-quadruplex structures will be inferred.

Additional information:

1. Research and doctoral theses shall be carried out within the project 2021/41/B/NZ2/03781, entitled *"Close Encounters of the Third Kind: what happens when ribonuclease Dicer encounters in the cell RNA and DNA adopting G-quadruplex structures"*, funded by the National Science Centre.
2. PhD students shall receive a stipend in the gross amount of ca 4 300 PLN (3 800 PLN net), for the period of 48 months with possible of further employment.
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/MSc Eng. degree in Molecular Biology, Biochemistry, Biotechnology or a related discipline.
2. Experience in basic molecular biology techniques, such as gel electrophoresis, PCR, cloning and recombinant DNA techniques (experience in the field of protein and nucleic acid biochemistry, human cell culture techniques and microscope imaging will be an asset).
3. Creativity and motivation for academic work.
4. Ability to work individually and cooperate in a team.
5. Good command of English, allowing to handle research papers and follow experimental protocols.

III. Duties in project:

1. Generation of genetic constructs and modified cell lines.
2. Studies of protein-nucleic acid interactions.
3. Optimization and implementation of protocols for imaging protein-nucleic acid interactions in human cells.
4. Presentation of the results at seminars and conferences.
5. Analysis of results and preparation of publications.

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=18c7c70133d9446fb074b7f1f1cb4e6a

VI. Submission deadline is **April 15, 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.
4. Knowledge of the subject matter described in the recruitment advertisement.

VIII. The recruitment procedure shall be concluded no later than **May 13, 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.