



**[50/2022/IGC/PSD] Announcement concerning recruitment to the Poznań Doctoral School of the Institutes of the Polish Academy of Sciences (PDS IPAS) as part of a research project**

The Director of the Institute of Human Genetics, Polish Academy of Sciences (IHG PAS), and leader of the current research project, **Marzena Gajęcka, PhD** gives notice of an open competition to be held for the position of **PhD student-scholarship holder at the Poznań Doctoral School of Institutes PAS, Department of Cancer Genetics IHG PAS**

Number of vacancies: **1**

**I. General information**

1. Department in which candidate would work: **Department of Cancer Genetics**
2. Discipline: **Medical Science**
3. Planned remuneration: scholarship to the value of about 4300 PLN gross/per month (**3800 PLN net /per month**)
4. Period of involvement in research project: **22 months (extension possible up to 36 months)**
5. Deadline for submission of documents: **09.01.2023 r.**
6. Date of announcement: **09.12.2022 r.**

The proposed study will be carried out within the **OPUS-21 2021/41/B/NZ5/02245**

**PI – Marzena Gajęcka, PhD**

Project title: **'Genome-wide assessment of chromatin accessibility and sequence variants in non-coding regulatory elements in the pathogenesis of keratoconus'**

**7. Concise description of research:**

**RESEARCH PROJECT OBJECTIVES / RESEARCH HYPOTHESES**

Numerous keratoconus (KTCN) loci, coding genes, and sequence variants were postulated as involved in the pathogenesis of KTCN. We HYPOTHEZIZE that accumulation of both variants in regulatory elements (REs) near the previously described KTCN candidate genes (e.g. adjacent to genes with mutations, SNPs, indels, and/or genes with differential expression) and the changes in chromatin availability, substantially impact phenotypic alterations in the KTCN corneal epithelium (CE) and corneal stroma (CS). THE GOAL OF THIS PROJECT is to decipher the potentially complex connections by determining KTCN-specific chromatin alterations and regions containing the REs with non-coding sequence variants affecting gene function, taking into account the implications of previously identified coding DNA sequence variation and altered expression in dysregulated signaling pathways in KTCN.

**STUDY DESIGN** The study will be performed on human corneas. Characterization of morphologically altered corneal regions surrounding the KTCN cone apex and subsequent topographic regions will be carried out in KTCN CE and CS, comparing the findings to the corresponding CE and CS topographic regions in control corneas. Cell nuclei, DNA, and corneal cryosections will be prepared and processed in the multi-omic approach including 1) Assay for Transposase- Accessible Chromatin with Sequencing (ATAC-Seq), 2) Whole-Genome Sequencing (WGS), 3) Spatial transcriptomics, and 4) Two-dimensional proteomic assessment. Functional significance of selected SNVs that could possibly affect the gene expression or function of REs, chosen based on integrated data of the ATAC-Seq, WGS, spatial transcriptomics, and two-dimensional proteomic assessment, will be further determined using the reporter assays in the Human Corneal Epithelial (HCEpC) and Human Corneal Keratocytes (HCK) cell lines. Our data/material samples obtained during previous KTCN research in

corneas will be used in the verification experiments, including Sanger sequencing, RT-qPCR, Western Blots, and immunohistochemistry. Finally, the performed bioinformatics integration analyzes will point to the KTCN-specific genomic, transcriptomic, and proteomic features, influencing the corneal morphological and structural alterations.

**Keywords:**

keratoconus, chromatin accessibility, regulatory elements, genome-wide assessment

**Predicted tasks in the project:**

- active participation in the realization of project goals and analysis of obtained results,
- presenting results at seminars and conferences, participation in writing scientific papers,
- supervision of master students.

**Opportunities:**

- work in an international research team, highly experienced in many molecular and cellular methodologies, and enthusiastic about conducting scientific research,
- participation in research training, international conferences and workshops.

**II. Requirements for candidates**

1. Master's degree in molecular biology, chemistry, biotechnology, genetics, medicine or related field,
2. Knowledge of molecular biology epigenetics, and basic knowledge of genetics in ophthalmology,
3. Knowledge of molecular biology techniques: PCR, RT-qPCR, preferably also Western blot, Sanger sequencing and the next generation sequencing (NGS), including data analyzes in NGS approaches,
4. Knowledge of genetic engineering techniques: designing of inserts for expression vectors and reporter assays,
5. Knowledge of the basics of working with cell lines: cell lines cultures, cell lines transfection,
6. Experience in work with DNA and RNA: extraction of nucleic acids,
7. Very good written and oral communication skills in English,
8. Motivation and enthusiasm about working in the field of science,
9. Good collaborative and team work skills.

**III. Required documents**

1. CV, including research achievements.
2. Cover letter.
3. A copy of the diploma confirming completion of a Master's Studies Programme, or a certificate of their completion (in the case of diplomas issued by foreign institutions, the diploma referred to in article 326 para.2 point 2 or article 327 para. 2 of the Act of 20 July 2018 – Law on Higher Education and Science (Journal of Laws of 2018, item 1668 as amended), giving the right to apply for a doctoral degree in the country in which the University of Higher Education issuing the diploma operates. If the candidate does not have the above-mentioned documents, s/he is obliged to provide them before being admitted to Poznań Doctoral School IPAS. More information about foreign diplomas is available at: <https://nawa.gov.pl/en/recognition/recognition-for-academic-purposes/applying-for-admission-to-doctoral-studies>.
4. Contact details of at least one current supervisor or other researcher who has previously agreed to issue an opinion about the candidate. The opinion should not be included in the application.

5. Consent for the processing of candidate's personal data for the purposes of the recruitment process: [http://bip.igcz.poznan.pl/wp-content/uploads/2018/10/Zgoda-rekrutacja-Consent for the processing.pdf](http://bip.igcz.poznan.pl/wp-content/uploads/2018/10/Zgoda-rekrutacja-Consent%20for%20the%20processing.pdf)
6. Application for admission to the Poznań Doctoral School IPAS, together with a consent to the processing of personal data for the purposes of the recruitment procedure plus a statement on his/her familiarity with recruitment regulations for the Poznań Doctoral School (Application is available on: <http://igcz.poznan.pl/en/phd-studies/poznan-doctoral-school-of-institutes-of-pas/recruitment-regulations-for-psd-ipan/> )
7. Certificates or other documents indicating level of English language proficiency, if the candidate possesses any.

#### **IV. Criteria for the evaluation of candidates**

1. Candidate's scientific and professional experience based on his/her participation in conferences, workshops, training courses and internships; participation in research and commercial projects; involvement in scientific societies and associations; international and professional mobility; experience in other sectors, including industry
2. Background in molecular biology
3. Candidate's scientific achievements, based on study grades, scientific and popular science publications, scholarships; prizes and awards resulting from research carried out; student activity or other achievements
4. Communication skills in English.

#### **V. Announcement of results**

Up to 30 days after the deadline of documents submission. Selected candidates will be invited for interview.

#### **VI. Additional conditions**

1. A condition of involvement in the project is participation in the Institutes of PAS (after passing the recruitment procedure). Details of the studies are available on [https://igcz.poznan.pl/en/phd-studies/poznan-doctoral-school-of-institutes-of-pas/Fulfillment of requirements as set out in the Regulations for Granting Scholarships in Research Grants Financed by the National Research Center are available on](https://igcz.poznan.pl/en/phd-studies/poznan-doctoral-school-of-institutes-of-pas/Fulfillment%20of%20requirements%20as%20set%20out%20in%20the%20Regulations%20for%20Granting%20Scholarships%20in%20Research%20Grants%20Financed%20by%20the%20National%20Research%20Center%20are%20available%20on%20) ([https://www.ncn.gov.pl/sites/default/files/pliki/uchwalyrady/2019/uchwala25\\_2019-zal1\\_ang.pdf](https://www.ncn.gov.pl/sites/default/files/pliki/uchwalyrady/2019/uchwala25_2019-zal1_ang.pdf)).

#### **VII. Additional information**

Address to which documents should be submitted:

by e-mail to the Secretary for Scientific Purposes: [phdstudies@igcz.poznan.pl](mailto:phdstudies@igcz.poznan.pl). Please, include the number of the announcement: [50/2022/IGC/PSD] in the title of your e-mail.

**Additional information is available from:**

Marzena Gajęcka: [marzena.gajeczka@igcz.poznan.pl](mailto:marzena.gajeczka@igcz.poznan.pl)

and [the Secretary for Scientific purposes: phdstudies@igcz.poznan.pl](mailto:phdstudies@igcz.poznan.pl)



Applications sent after the deadline will not be considered.

Once the recruitment process is finished, unsuccessful candidates will be informed about the scores they have obtained at each step of evaluation.

Refusal of admission to PDS IPAS takes place by way of an administrative decision. The candidate is entitled to submit a request for reconsideration of the decision to the director of the institute concerned.

Project Leader

Małgorzata Chmiel

Director of the Institute

**DIRECTOR**  
Institute of Human Genetics  
Polish Academy of Sciences  
Prof. Michał Witt, MD PhD