



Two research scholarships available 'Anti-crossover functions of the main crossover pathway proteins'

Two scholarships of 2500 PLN (net) are available in the Laboratory of Genome Biology led by Prof. Piotr Ziolkowski at the Adam Mickiewicz University, Poznan, Poland. Scholarships will be awarded as a part of the project MAESTRO #2024/54/ANZ2/00266 for a period of four years (from 1.10.2025 to 30.11.2029).

Project

Meiotic recombination begins with DNA double-strand breaks (DSBs), repaired as crossovers (COs) or non-crossovers (NCOs). COs generate allelic diversity and ensure proper chromosome segregation, but only a small fraction of DSBs yield COs – for instance, ~200 DSBs in *Arabidopsis thaliana* produce only ~10 COs. The reasons for limiting COs remain unclear, as higher CO levels are well tolerated in plants.

In wild type, most COs arise through the ZMM pathway (Class I COs). Loss of ZMM proteins reduces COs and fertility but reveals a secondary Class II pathway, usually suppressed by RECQ4 helicases. Unexpectedly, we found that blocking ZMM function while removing RECQ4 causes a ~4.5-fold CO increase, suggesting competition between pathways and an anti-Class II role of ZMM proteins, with only mild fertility loss.

This project will investigate the anti-recombinational function of ZMM proteins. Using Illumina sequencing and our seed-typing method, we will map CO frequency, distribution, and hotspot activity in *zmm recq4* mutants, generating Class II CO datasets for comparison with Class I. We will also test whether similar effects occur in synaptonemal complex and MutLy mutants, analyzing genome-wide CO patterns, interference, and heterochiasmy with sex-specific maps. Cytogenetic approaches will determine whether elevated COs reflect increased DSBs. Finally, we will examine the evolutionary impact of increased CO frequency by propagating mutant combinations for 20 generations and using long-read sequencing (ONT) to assess genome stability, focusing on structural rearrangements.

In summary, this project will clarify the unexpected anti-recombinational role of ZMM proteins and provide insight into why eukaryotes limit crossover numbers.

Requirements

The successful candidates will have master's degree in biotechnology, biology or related field and a solid knowledge in molecular biology and genetics. Candidates with a good background and hand-on experience on *Arabidopsis* molecular genetics and bioinformatics skills are encouraged to apply. The project would significantly benefit from applying *Arabidopsis* meiotic cytology, therefore this expertise is considered an advantage.

We offer:

- Supportive and stimulating environment in an international, friendly and well-equipped research group
- Access to newly developed methodology and cutting-edge technologies in plant genetics and molecular biology
- A chance to develop new skills in research, paper writing and grant application

Please submit the following documents with your application:

- CV which gives an overview of the academic/education history
- Letter of motivation
- Names and contact information of at least two academic referees

Application deadline: **15.09.2025**

For further details contact us by email:

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Please include in your application the Information Clause (see next page)

INFORMATION CLAUSE

In accordance with the Regulation of the European Parliament and of the Council (EU) 2016/679 of April 27, 2016 on the protection of individuals with regard to the processing of personal data and on the free movement of such data and repealing Directive 95/46/EC (Data Protection Directive), Adam Mickiewicz University in Poznan informs:

1. the Administrator of your personal data is Adam Mickiewicz University in Poznan with its seat at 1 Wieniawskiego, 61 - 712 Poznan;
2. the Administrator has appointed a Data Protection Supervisor (pol. Inspektor Danych Osobowych) supervising the correctness of personal data processing, who can be contacted via e-mail address: iod@amu.edu.pl;
3. your personal data will be processed in order to: carry out the recruitment process and select a scholarship recipient;
4. the data you provide will be processed on the basis of your consent to the processing of personal data;
5. the data will not be made available to external entities except to entities authorized by law;
6. the data will be stored for a period of 6 months after the end of the recruitment;
7. you have the right to access the content of your data and, subject to the law, the right to rectify, delete, limit processing, the right to object, the right to withdraw consent at any time;
8. you have the right to lodge a complaint with the President of the Office for Personal Data Protection;
9. your provision of personal data at the recruitment stage is voluntary, but if you do not provide it, you will not be able to participate in the recruitment procedure.”