

Prospective supervisor's form

Name of the supervisor: Maria J. MILEWSKA

Academic title: professor

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Discipline: chemical sciences [NCh] none

Optional

Key words (obligatory four key words describing research interests / expertise):

synthesis of biologically active compounds

synthesis of nanocarrier-drug conjugates

crystal engineering

ionic liquids

Bibliometric indicators

1. Number of journal publications in WoS/ Scopus 62/59

2. Citations excluding self-citations WoS 655 Scopus 630

3. Hirsch index WoS 15 Scopus 15

1. The number of PhD students who have graduated under your supervision: 6

2. The number of PhD students currently supervised:

a. within the current doctoral school 0

b. within doctoral studies (previous system) 1

3. Are you currently accepting new PhD students:

a. Polish Yes/No Yes

b. Foreign Yes/No No

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Research interests or topics offered for PhD research (no more than 2000 characters)ⁱⁱ

Synthesis of siderophore:antimetabolite conjugates with potential antifungal activity

Microbial systems of iron acquisition take advantage of siderophores, i.e. low molecular weight, iron-chelating compounds, synthesized and secreted under iron-limited conditions. Complexes of siderophores with Fe(III) are specifically recognized and taken up by proteins constituting the transport system. On the other hand, many metabolic inhibitors, considered to be potential candidates for antifungal agents, show very limited ability to penetrate the biological membranes of target cells. Siderophores of human pathogenic fungi are mostly derivatives of hydroxamic acids. The basic idea of this project is to use fungal hydroxamate siderophores or its analogs as carriers for antimetabolites to obtain conjugates exhibiting antifungal activity, with the mode of action in a 'Trojan horse-like' fashion. The research will include a rational design and synthesis of analogs of fungal siderophores and their conjugation with selected antimetabolites, like FMDP, cis-pentacin or RI-331. The conjugates will contain enzyme-cleavable linker systems to ensure effective intracellular release of a "warhead" antimetabolite.

Funding or special equipment needed to carry out a PhD project ⁱⁱⁱ:

1. Is funding available for experimental work: *Yes/No/not needed*

Yes

2. Is the equipment needed to complete a PhD project

available in your lab/department: *Yes/No/not needed*

Yes

Most important publications – no more than 5 published after 1.01.2018

No	Authors/title/journal	Number of points according to the current list of the Ministry of Science and Higher Education	Publication year
1.	A. S. Skwarecki, K. Skarbek, D. Martynow, M. Serocki, S. Milewski, M. J. Milewska/Molecular umbrellas modulate the selective toxicity of polyene macrolide antifungals/Bioconjugate Chemistry, 29, 1454-1465	100	2018
2.	E. Borowski, N. Salewska, J. Boros-Majewska, M. Serocki, I. Chabowska, M. J. Milewska, D. Ziętkowski, S. Milewski/The substantial improvement of Amphotericin B selective toxicity upon modification of mycosamine with bulky substituents/Medicinal Chemistry, 16, 128-139	70	2020

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3.	Ł. Marcinkowski, E. Szepiński, M. J. Milewska, A. Kloskowski/Density, sound velocity, viscosity and refractive indices of new morpholinium ionic liquids with amino acid-based anions: Effect of temperature, alkyl chain length and anion/Journal of Molecular Liquids, 284, 557–568	100	2019
4.	E. Szepiński, D. Martynow, P. Szweda, M. J. Milewska, S. Milewski/Voriconazole-based salts are active against multidrug-resistant human pathogenic yeasts/Molecules, 24, 3635–3643	100	2019
5.	E. Szepiński, P. Smolarek, M. J. Milewska, J. Łuczak/Application of surface active amino acid ionic liquids as phase-transfer catalyst/ Journal of Molecular Liquids, 303, 112607	100	2020

Most recent externally funded projects you were involved in – no more than 3

No	Project title, the name of the Principal Investigator (PI) and the institution the project was carried out	Years	Role in the project ^{iv}
1.	NCN OPUS programme: Semisynthetic analogs of the antifungal polyene macrolide antibiotic of improved selective toxicity; Maria J. Milewska; Gdańsk University of Technology	2015-2018	PI
2.	Ministry of Higher Education and Science programme: Sustainable methods of synthesis of N-substituted derivatives of polyene macrolide antifungal antibiotics; Maria J. Milewska; Gdańsk University of Technology	2010-2012	PI
3.	National Centre for Research and Development programme: POIG.01.04.00-22-064/09-00 Innovative compounds of potential application in antifungal chemotherapy; Edward Borowski; BLIRT S.A.	2011-2013	R

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Additional relevant information (no more than 1600 characters)^v



- ⁱ You may select up to two disciplines out of 12 disciplines represented in the Doctoral School
- ⁱⁱ Observe the limit of not more than 2000 characters
- ⁱⁱⁱ Leave only one answer
- ^{iv} Select the role in the project: PI stands for principal investigator (refers to the holder of an independent grant and the lead researcher for the grant project), Co-I for co-investigator (Co-I assists the principal investigator in the management and leadership of the research project), R for researcher
- ^v Add any other relevant information e.g. awards for PhD students whom you supervised (no more than 1600 characters)