CENTRE OF POSTGRADUATE MEDICAL EDUCATION
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Anna Filipkowska (Technician)	
Ewa Buszko (Administrative Associate)	

RESEARCH TOPICS

We investigate the molecular factors and mechanisms that regulate cellular processes involved in the pathogenesis of various diseases. Our key research areas include:

- **autoimmune diseases** (including Graves' Disease with orbitopathy; *in vivo* mouse model)
- **cancer**, including development of **multidrug resistance** (*in vitro*; thyroid and breast cancer)
- **cancer nano-therapies** (*in vitro*)
- **maintenance** of **genome stability** (*in vitro, in vivo*)
- **infectious diseases** (pathogenic *E. coli*, bacterial stress responses; *in vitro; in vivo* models)
- **aging of erythrocytes** (*in vitro*)

EXTERNAL RESEARCH GRANTS (ONGOING)

2024-2028; **National Science Centre OPUS** grant titled: "*Role of gut metabolites in immunomodulation of Graves' disease and orbitopathy in preclinical mouse model*"; PI: Marlena Godlewska; amount of funding: ca. 500 000 EUR

2021-2026; **National Science Centre PRELUDIUM** grant titled: "*Analysis of the role of miR-7-5p in modulating multidrug resistance in glioblastoma cells*"; PI: Ewa Gajda; amount of funding: ca. 60 000 EUR

2020-2025; **National Science Centre OPUS** grant titled: "*Identification and analysis of novel pathogenicity markers in uropathogenic Escherichia coli*"; PI: Damian Gawel; amount of funding: ca. 260 000 EUR

2019-2024; **National Science Centre OPUS** grant titled: "*Determination of mechanisms and critical molecular partners controlling the multidrug resistance proteins (P-gp and BCRP) expression and functionality in the thyroid carcinoma model*"; PI: Marlena Godlewska; amount of funding: ca. 250 000 EUR

MAIN COLLABORATORS

Prof. Paul, J. Banga, King's College London, (UK)
Prof. Roel Schaaper, National Institute of Environmental Health Sciences, (USA)
Prof. Eileen Kennedy, University of Georgia, (USA)

Prof. Iwona Fijalkowska, Institute of Biochemistry and Biophysics, (Poland)
Prof. Ewa Nazaruk, University of Warsaw, (Poland)
Prof. Przemysław Juszczyński, Institute of Hematology and Transfusion Medicine, (Poland)

RESEARCH STAYS

2024, **University Medical Center Groningen**, NL (Anna Betkowska)
2015, **International Centre for Genetic Engineering and Biotechnology**, IT (Ewa Gajda)
2015, **Maastricht University**, NL (Ewa Gajda)
2008-2011, **Duke University, Duke Medical Center**, Durham, NC, USA (Damian Gawel)
2006, **King's College London**, UK (Marlena Godlewska)
2003-2008, **National Institute of Environmental Health Sciences**, NC, USA (Damian Gawel)

MAIN TECHNIQUES

•Western blot, •immunoprecipitation, •ELISA, •Site-directed mutagenesis, •Gene silencing, •RT-qPCR, •Immunocytochemistry and immunohistochemistry, •Flow cytometry, •DNA cloning, •Cell cultures and physiological tests (cell motility and invasiveness, apoptosis, proliferation, drug intake, colony formation, mutagenesis assays and spheroids)

PUBLICATIONS (2019-present; JCR list)

2024:

- Nazaruk, E.; Gajda, E.; Ziędalska, I.; Godlewska, M.; Gawel, D. **Enhancement of Temozolomide Stability and Anticancer Efficacy by Loading in Monopalmitolein-Based Cubic Phase Nanoparticles**. *ACS Omega* 2024, 9, 38936-38945, doi:10.1021/acsomega.4c05291.
- Gawel, A.M.; Betkowska, A.; Gajda, E.; Godlewska, M.; Gawel, D. **Current Non-Metal Nanoparticle-Based Therapeutic Approaches for Glioblastoma Treatment**. *Biomedicines* 2024, 12, doi:10.3390/biomedicines12081822.
- Kokot, A.; Gadakh, S.; Saha, I.; Gajda, E.; Łaźniewski, M.; Rakshit, S.; Sengupta, K.; Mollah, A.F.; Denkiewicz, M.; Górczak, K.; et al. **Unveiling the Molecular Mechanism of Trastuzumab Resistance in SKBR3 and BT474 Cell Lines for HER2 Positive Breast Cancer.** *Curr Issues Mol Biol.* 2024, 46, 2713-2740, doi:10.3390/cimb46030171.
- Linowiecka K, Szpotan J, Godlewska M, Gaweł D, Zarakowska E, Gackowski D, Brożyna AA, Foksiński M. **Selective Estrogen Receptor Modulators' (SERMs) Influence on TET3 Expression in Breast Cancer Cell Lines with Distinct Biological Subtypes.** *Int J Mol Sci.* 2024; 25(16):8561.
- Stachurska-Skrodzka, A.; Mielecki, D.; Fijałkowska, A.; Żebrowska, K.; Kasperczak, M.; Kosińska-Kaczyńska, K. **Is Feto-Maternal Transfusion after Cesarean Delivery Different in Singleton and Twin Pregnancy**? *J Clin Med.* 2024, 13, doi:10.3390/jcm13123609.
- Mielecki, D.; Detman, A.; Aleksandrzak-Piekarczyk, T.; Widomska, M.; Chojnacka, A.; Stachurska-Skrodzka, A.; Walczak, P.; Grzesiuk, E.; Sikora, A. **Unlocking the genome of the non-sourdough Kazachstania humilis MAW1: insights into inhibitory factors and phenotypic properties**. *Microb Cell Fact.* 2024, 23, 111, doi:10.1186/s12934-024-02380-7.

2023:

- Mielecki, D.; Gajda, E.; Sikorska, J.; Betkowska, A.; Rozwadowski, M.; Gawel, A.M.; Kulecka, M.; Zeber-Lubecka, N.; Godlewska, M.; Gawel, D. **Resolving the role of podoplanin in the motility of papillary thyroid carcinoma-derived cells using RNA sequencing**. *Comput Struct Biotechnol J.* 2023, 21, 3810-3826, doi:10.1016/j.csbj.2023.07.035.

- Mielecki, D.; Grzesiuk, E.; Bednarska, A.; Garbicz, D.; Świderska, B.; Grzesiuk, M. **Contamination of aquatic environment with anticancer reagents influences Daphnia magna - Ecotoxicogenomics approach.** *Ecotoxicol Environ Saf.* 2023, 249, 114372, doi:10.1016/j.ecoenv.2022.114372.

2022:

- Bartkowiak, A.; Nazaruk, E.; Gajda, E.; Godlewska, M.; Gaweł, D.; Jabłonowska, E.; Bilewicz, R. **Simvastatin Coadministration Modulates the Electrostatically Driven Incorporation of Doxorubicin into Model Lipid and Cell Membranes**. *ACS Biomater Sci Eng.* 2022, 8, 4354-4364, doi:10.1021/acsbiomaterials.2c00724.
- Bauer, A.; Habior, A.; Gawel, D. **Diagnostic and Clinical Value of Specific Autoantibodies against Kelch-like 12 Peptide and Nuclear Envelope Proteins in Patients with Primary Biliary Cholangitis**. *Biomedicines* 2022, 10, doi:10.3390/biomedicines10040801.
- Rozwadowski, M.; Gawel, D. **Molecular Factors and Mechanisms Driving Multidrug Resistance in Uropathogenic**. *Genes* (Basel) 2022, 13, doi:10.3390/genes13081397.
- Grzanka, M.; Stachurska-Skrodzka, A.; Adamiok-Ostrowska, A.; Gajda, E.; Czarnocka, B. **Extracellular Vesicles as Signal Carriers in Malignant Thyroid Tumors?** *Int J Mol Sci.* 2022, 23, 3262, doi:10.3390/ijms23063262.

2021:

- Jabłonowska, E.; Matyszewska, D.; Nazaruk, E.; Godlewska, M.; Gaweł, D.; Bilewicz, R. **Lipid membranes exposed to dispersions of phytantriol and monoolein cubosomes: Langmuir monolayer and HeLa cell membrane studies**. *Biochim Biophys Acta Gen Subj.* 2021, 1865, 129738, doi:10.1016/j.bbagen.2020.129738.
- Trybus, W.; Król, T.; Trybus, E.; Stachurska, A. **Physcion Induces Potential Anticancer Effects in Cervical Cancer Cells.** *Cells* 2021, 10, doi:10.3390/cells10082029.
- Bauer, A.; Habior, A.; Wieszczy, P.; Gawel, D. **Analysis of Autoantibodies against Promyelocytic Leukemia Nuclear Body Components and Biochemical Parameters in Sera of Patients with Primary Biliary Cholangitis**. *Diagnostics* (Basel) 2021, 11, doi:10.3390/diagnostics11040587.
- Gaweł, A.M.; Ratajczak, M.; Gajda, E.; Grzanka, M.; Paziewska, A.; Cieślicka, M.; Kulecka, M.; Oczko-Wojciechowska, M.; Godlewska, M. **Analysis of the Role of FRMD5 in the Biology of Papillary Thyroid Carcinoma**. *Int J Mol Sci.* 2021, 22, doi:10.3390/ijms22136726.
- Ratajczak, M.; Gaweł, D.; Godlewska, M. **Novel Inhibitor-Based Therapies for Thyroid Cancer-An Update**. *Int J Mol Sci.* 2021, 22, doi:10.3390/ijms222111829.
- Wawrowicz, K.; Majkowska-Pilip, A.; Gaweł, D.; Chajduk, E.; Pieńkowski, T.; Bilewicz, A. **Au@Pt Core-Shell Nanoparticle Bioconjugates for the Therapy of HER2+ Breast Cancer and Hepatocellular Carcinoma. Model Studies on the Applicability of 193mPt and 195mPt Radionuclides in Auger Electron Therapy**. *Molecules* 2021, 26, doi:10.3390/molecules26072051.

2020:

- Gajda, E.; Grzanka, M.; Godlewska, M.; Gawel, D. **The Role of miRNA-7 in the Biology of Cancer and Modulation of Drug Resistance**. *Pharmaceuticals* (Basel) 2021, 14, doi:10.3390/ph14020149.
- Gajda, E.; Godlewska, M.; Mariak, Z.; Nazaruk, E.; Gawel, D. **Combinatory Treatment with miR-7-5p and Drug-Loaded Cubosomes Effectively Impairs Cancer Cells**. *Int J Mol Sci*. 2020, 21, doi:10.3390/ijms21145039.

2019:

- Trybus, W.; Król, T.; Trybus, E.; Stachurska, A.; Król, G.; Kopacz-Bednarska, A. **Emodin Induces Death in Human Cervical Cancer Cells Through Mitotic Catastrophe**. *Anticancer Res*. 2019, 39, 679-686, doi:10.21873/anticanres.13163.
- Sikorska, J.; Gaweł, D.; Domek, H.; Rudzińska, M.; Czarnocka, B. **Podoplanin (PDPN) affects the invasiveness of thyroid carcinoma cells by inducing ezrin, radixin and moesin (E/R/M) phosphorylation in association with matrix metalloproteinases**. *BMC cancer* 2019, 19, 85-85, doi:10.1186/s12885-018-5239-z.
- Makiela-Dzbenska, K.; Maslowska, K.H.; Kuban, W.; Gawel, D.; Jonczyk, P.; Schaaper, R.M.; Fijalkowska, I.J. **Replication fidelity in E. coli: Differential leading and lagging strand effects for dnaE antimutator alleles**. *DNA Repair* (Amst) 2019, 83, 102643, doi:10.1016/j.dnarep.2019.102643.
- Godlewska, M.; Gawel, D.; Buckle, A.M.; Banga, J.P. **Thyroid Peroxidase Revisited - What's New**? *Horm Metab Res*. 2019, 51, 765-769, doi:10.1055/a-1057-9469.
- Rudzińska, M.; Grzanka, M.; Stachurska, A.; Mikula, M.; Paczkowska, K.; Stępień, T.; Paziewska, A.; Ostrowski, J.; Czarnocka, B. **Molecular Signature of Prospero Homeobox 1 (PROX1) in Follicular Thyroid Carcinoma Cells**. *Int J Mol Sci*. 2019, 20, doi:10.3390/ijms20092212.
- Dziawer, Ł.; Majkowska-Pilip, A.; Gaweł, D.; Godlewska, M.; Pruszyński, M.; Jastrzębski, J.; Wąs, B.; Bilewicz, A. **Trastuzumab-Modified Gold Nanoparticles Labeled with (211)At as a Prospective Tool for Local Treatment of HER2-Positive Breast Cancer**. *Nanomaterials* (Basel, Switzerland) 2019, 9, 632, doi:10.3390/nano9040632.

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