UMCS

FACULTY OF BIOLOGY AND BIOTECHNOLOGY

Department of Molecular Biology

Head: prof. Marek Tchórzewski

prof. Marek Tchórzewski –master's thesis supervisor

dr Przemysław Grela – bachelor's and master's thesis supervisor

dr Barbara Michalec-Wawiórka – bachelor's and master' thesis supervisor

dr Leszek Wawiórka – bachelor's and master's thesis supervisor

Research topics carried out in the Deparment of Molecular Biology

Functional analysis of the translational aparatus in yeast cells (L. Wawiórka)

Methods used in research

gene constructs preparation isolation and amplification of DNA, transformation of bacteria and yeast cells

isolation of RNA and proteins, RT-qPCR

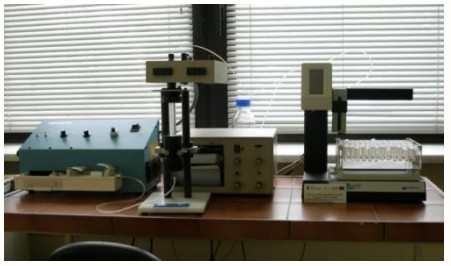
antibiotic susceptibility tests

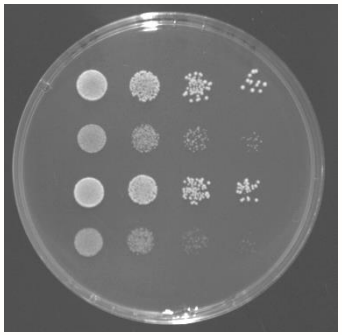
incorporation of [35S] Met to proteins in *vivo*

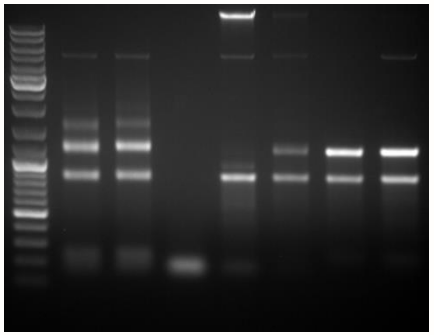
polysome profile analysis

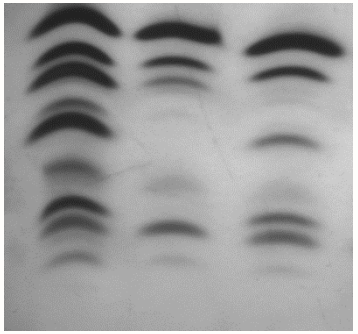
dual luciferase reporter assay

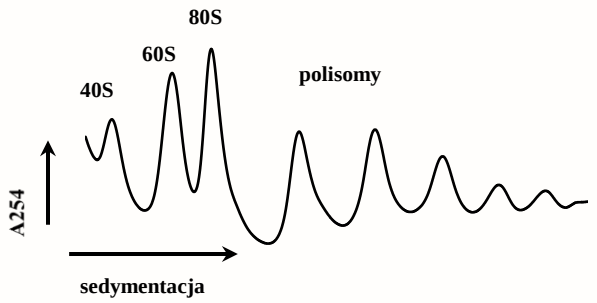
protein analysis (SDS/PAGE , wetern blotting, IEF)











Methods used in research

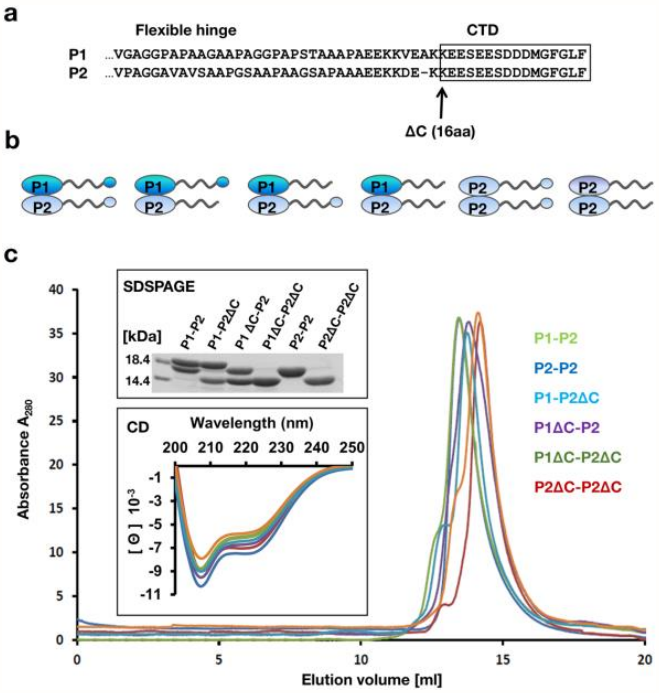
heterologous eukaryotic genes expression (construction of recombinant vectors, isolation and amplification of the DNA

agarose electrophoresis of the DNA, bacterial cells culture)

protein purification (differential centrifugation, ion-exchange chromatography, affinity chromatography, size exclusion chromatography

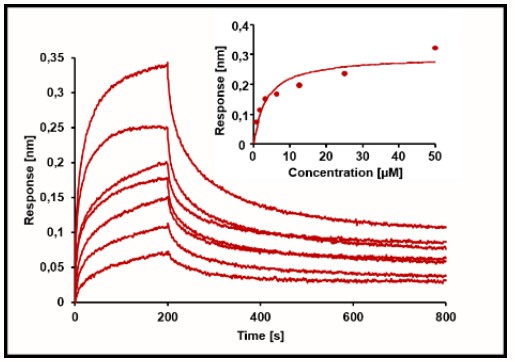
protein bio-physical analysis (circular dichroism,

nano-differential scanning fluorimetry, analytical size exlusion chromatography, protein mass spektrometry, protein electrophoresis in native and denaturing conditions)



bio-physical characteristics of protein-protein interactions

(microscale thermophoresis, bio-layer interferometry)



Functional analysis of the translational aparatus in mammalian cells

(B. Michalec-Wawiórka)

Methods used in research

gene construct preparation, isolation and amplification of DNA,

agarose electrophoresis

mammalian cells culture,

stable and transient transfection

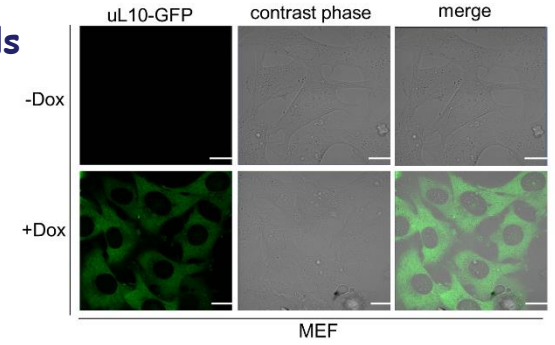
regulated gene expression in mammalian cells

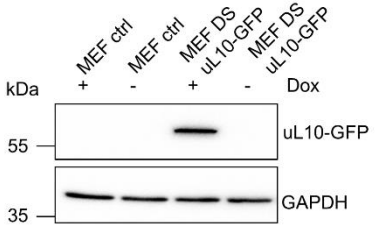
confocal microscopy

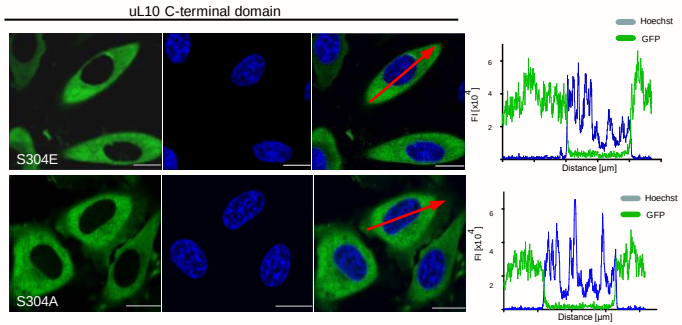
immunoprecipitation

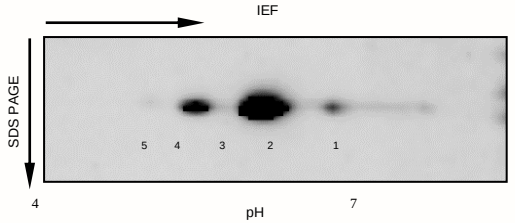
immunocytochemistry,

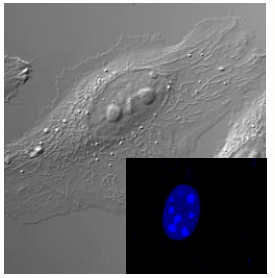
protein analysis (SDS/PAGE, western blotting, 2-DE)

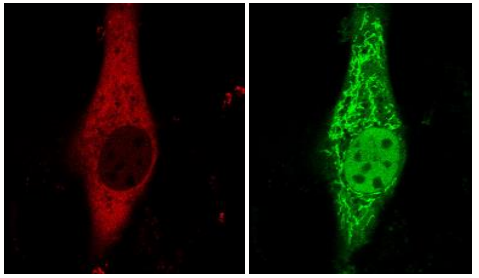












Examples of bachelor theses (dr Przemysław Grela)

„Cannabinoids - molecular basis of use in the treatment of drug-resistant epilepsy”

„Telomerase in cancer therapies”

„Nanomedicine as a tool to fight human immunodeficiency virus (HIV)”

„Eryptosis - apoptosis of red blood cells”

Examples of bachelor theses (dr Barbara Michalec-Wawiórka)

„Mechanism of carcinogenesis in ribosomopathies”

„Cancer therapies of Hepatocelullar carcinoma”

„Stem cells in regenerative medicine”

„Molecular mimicry in autoimmune disease”

Examples of bachelor theses (dr Leszek Wawiórka)

„Molecular determinants of the pathogenesis and therapy of Spinal Muscular Atrophy (SMA)”

„Development of molecular biology techniques as a driving force of modern biotechnology”

„Receptors activated by protease in the context of cardiovascu-lar disease pathogenesis.”

„The ageing process in human somatic cells”

Examples of master theses (dr Przemysław Grela)

„Heterologous expression and purification of human uL10ΔC (P1-P2ΔC)2 complex proteins and interaction analysis with the ricin catalytic subunit”

„Heterologus expression and purification of uL10(P1-P2)2 human proteins complex and analysis of its interaction with the ricin catalytic subunit”

„Heterologous expression and purification of human ribosomal P1and P2 proteins, their interaction with the ricin catalytic subunit”

Examples of master theses (dr Barbara Michalec-Wawiórka)

„Optimization of the regulated expression of uL10-GFP protein in mammalian cells”

„Role of G68E substitution in determining of subcellular localization of protein hMrt4 mutant type of „gain of function”

Examples of master theses (prof. Marek Tchórzewski)

„Evaluation of the biological activity of the uL11 ribosomal protein in the in vivo system using cell lines as an experimental model”

„Analysis of the interaction of a dimer of recombinant ribosomal proteins P1-P2 with trichosanthin”

„Analysis of the subcellular localization of the uL10β protein under stress of the endoplasmic reticulum”

„Functional characteristics of the CK2 protein kinase subunits in the context od cellular stress”

„The role of phosphorylation of ribosomal P proteins in interaction with the translational GTPase eIF5B”

„Purification and initial characterization of the elongation factor eEF1A from yeast Saccharomyces cerevisiae”