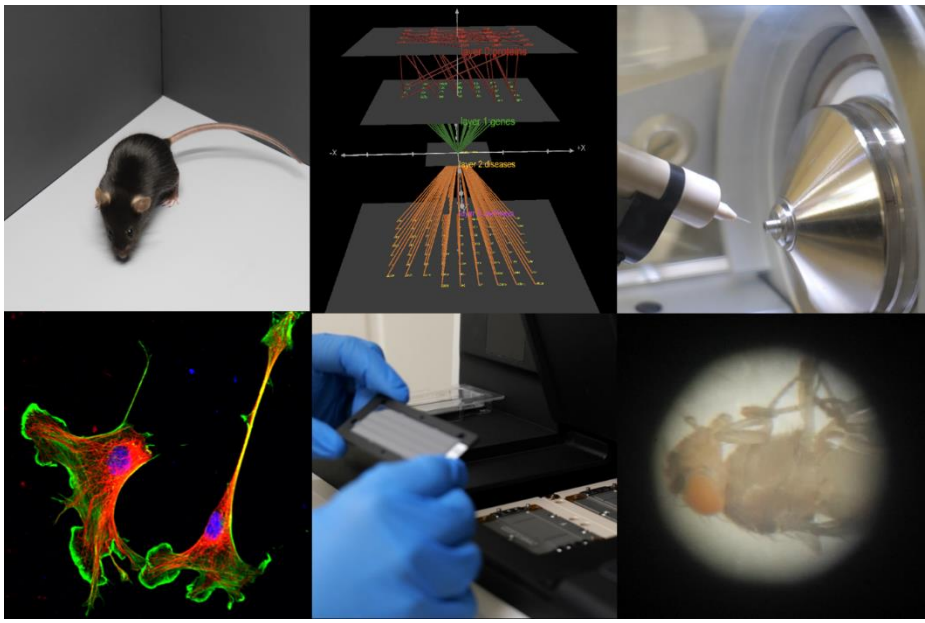
DECEMBER 2024
NEWSLETTER 4

"ALEXANDER FLEMING"
Biomedical Sciences Research Center



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Reviews & Book Chapters

Dear readers,

As the year draws to a close, we take pride in reflecting on the research accomplishments of 2024 and excited to present the 4th edition of our newsletter, showcasing a selection of the publications that have emerged from our Center this year.

We are grateful for the dedication and hard work of our researchers, whose passion for science drives our Center's mission forward.

We also extend our thanks to our research collaborators in Greece and all over the world, whose contributions and partnerships are invaluable to our success.

For a full list of the Center's 2024 publications please visit https://www.fleming.gr/research/fleming-publications

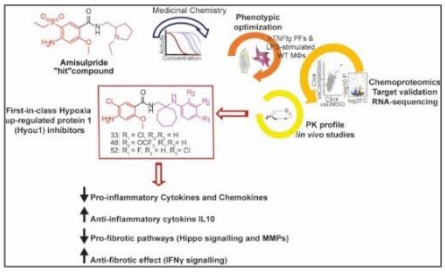
Here's to a wonderful holiday season and a new year filled with inspiration and joy!

Warmest wishes,
From all of us at the BSRC "Alexander Fleming"

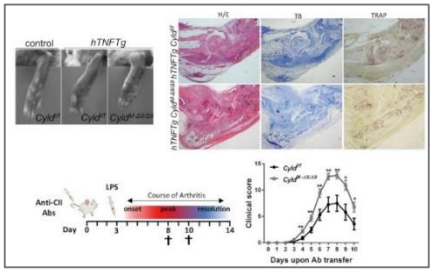
In 2024, our Center made significant strides in understanding the basis of chronic & genetic diseases and bringing us one step closer to their treatment. We discovered the first-in-class inhibitors for HYOU1, whose targeting offers new hope for modulating fibroblast activation and treating **chronic inflammatory and fibrotic disorders**. We also identified the regulatory role of Cyld in controlling synovial fibroblast hyperactivation in **rheumatoid arthritis** potentially paving the way for novel therapeutic strategies. Our research on **Crohn's disease** revealed the dominant pathogenic functions of IL-23, emphasizing its critical role in ileitis and suggesting more effective treatment approaches. Additionally, we uncovered the involvement of Cockayne syndrome B protein in transcription and chromatin dynamics, providing deeper insights into the molecular mechanisms underlying the **Cockayne Syndrome** severe progeroid disorder.

Human Disease Research

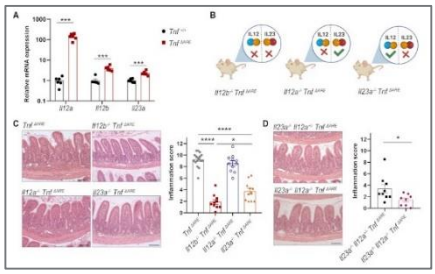
MEDICINAL CHEMISTRY & IN VIVO STUDIES



Papadopoulou et al. "Discovery of the First-in-Class Inhibitors of Hypoxia Up-Regulated Protein 1 (HYOU1) Suppressing Pathogenic Fibroblast Activation." Angew Chem Int Ed Engl. (2024). https://doi.org/10.1002/anie.202319157

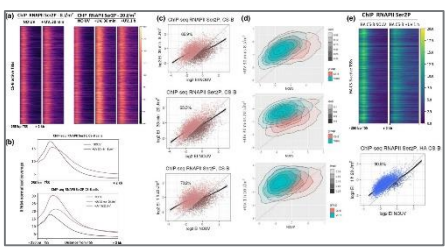


Rinotas et al. "Cyld restrains the hyperactivation of synovial fibroblasts in inflammatory arthritis by regulating the TAK1/IKK2 signaling axis." Cell Death Dis. (2024). doi: 10.1038/s41419-024-06966-2



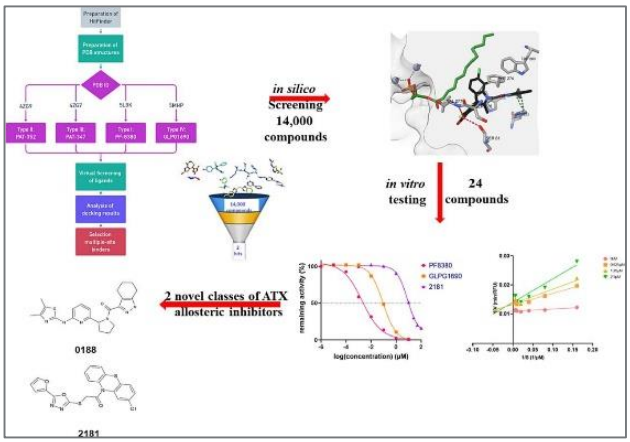
Iliopoulou et al. "IL-23 Exerts Dominant Pathogenic Functions in Crohn's Disease-Ileitis." Mucosal Immunology (2024). https://doi.org/10.1016/j.mucimm.2024.05.008

REGULATORY (EPI)GENOMICS



Liakos et al. "Cockayne syndrome B protein is implicated in transcription and associated chromatin dynamics in homeostatic and genotoxic conditions." Aging Cell (2024). https://onlinelibrary.wiley.com/doi/10.1111/acel.14341

CHEMINFORMATICS

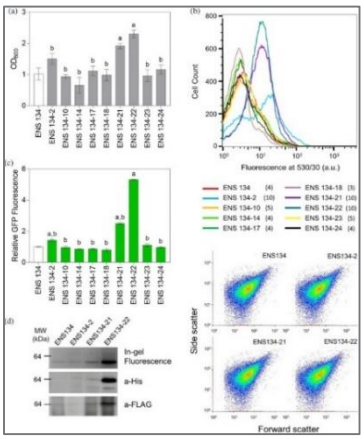


Stylianaki et. al "Identification of two novel chemical classes of Autotaxin (ATX) inhibitors using Enalos Asclepios KNIME nodes." Bioorg Med Chem Lett. (2024). https://doi.org/10.1016/j.bmcl.2024.129690

Bioinformatics & Biotechnology

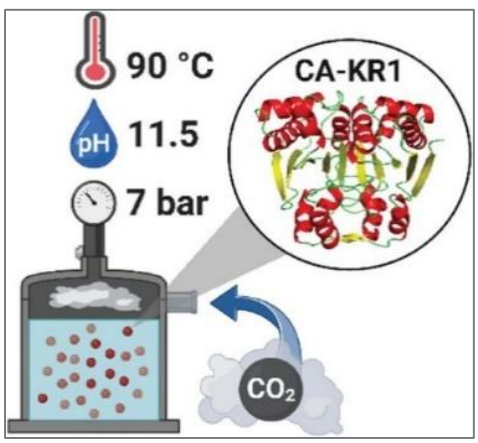
Our bioinformatics and biotechnology research in 2024 led to groundbreaking discoveries. We identified two novel chemical classes of Autotaxin (ATX) inhibitors, potentially revolutionizing the treatment of **fibrotic diseases and cancer**. Our work with Escherichia coli unveiled a new strain of bacteria, SuptoxRNE22, capable of significantly enhancing membrane protein production, offering a valuable tool for **biotechnological applications**. Moreover, we discovered a highly stable carbonic anhydrase enzyme, CA-KR1, which shows promise for industrial CO_2 capture, presenting an eco-friendly solution to combat **global warming**.

SYNTHETIC BIOLOGY



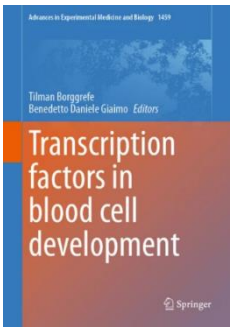
Vasilopoulou et al. "Escherichia coli strains with precise domain deletions in the ribonuclease RNase E can achieve greatly enhanced levels of membrane protein production.“ Protein Science. (2024). https://doi.org/10.1002/pro.4864

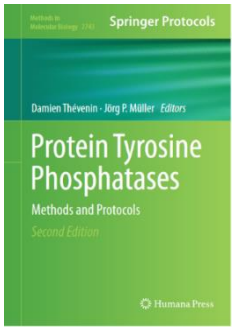
ENVIRONMENTAL SCIENCE



Rigkos et al. "Biomimetic CO_2 Capture Unlocked through Enzyme Mining: Discovery of a Highly Thermo-and Alkali-Stable Carbonic Anhydrase." Environmental Science & Technology (2024). https://doi.org/10.1021/acs.est.4c04291

IMMUNOLOGY MASS SPECTROMETRY



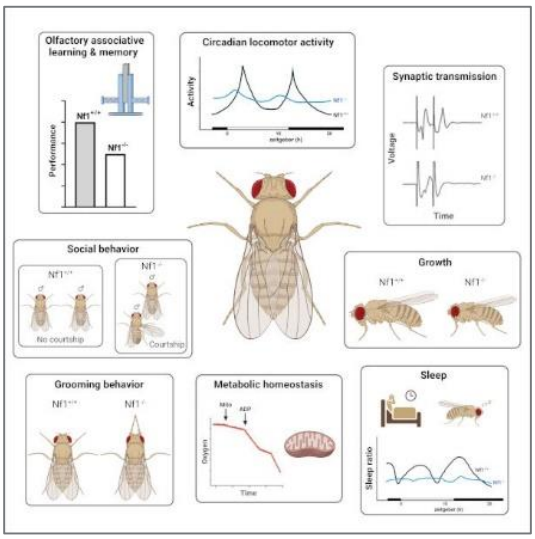


Konstantakopoulou C. and Verykokakis M. “Key functions of the transcription factor Bcl6 during T cell development” Adv Exp Med Biol. (2024). DOI: 10.1007/978-3-031-62731-6_4

Samiotaki et al. "Detection of Protein Tyrosine Phosphatase Interacting Partners by Mass Spectrometry“ Methods Mol Biol. (2024). DOI: 10.1007/978-1-0716-3569-8_11

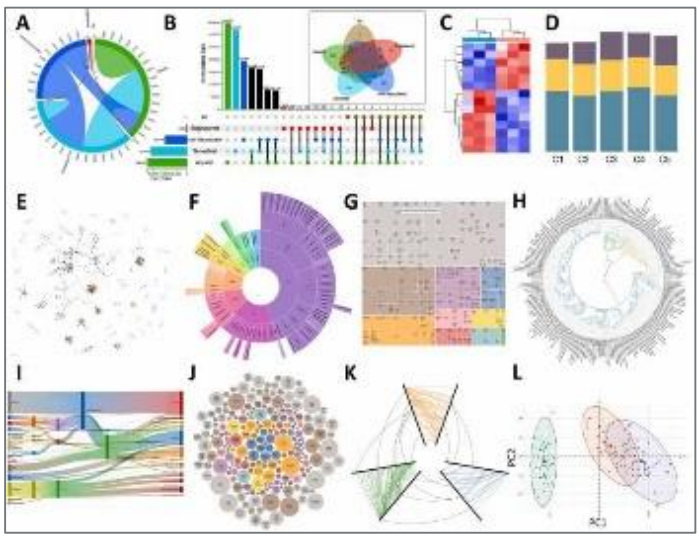
Reviews & Book Chapters

NEUROSCIENCE



Atsoniou et al. "Drosophila Contributions towards Understanding Neurofibromatosis 1.“ Cells. (2024). https://doi.org/10.3390/cells13080721

METAGENOMICS



Aplakidou et al. "Visualizing metagenomic and metatranscriptomic data: A comprehensive review“ Comput Struct Biotechnol J. (2024). https://doi.org/10.1016/j.csbj.2024.04.060

Our reviews and book chapters in 2024 provided comprehensive insights into various fields. We explored the role of Drosophila in understanding **Neurofibromatosis 1**, shedding light on the disease’s cellular mechanisms and potential therapeutic strategies. Our review on visualizing metagenomic and metatranscriptomic data highlighted advanced tools for effectively analyzing **complex biological datasets**. We also delved into the critical functions of the transcription factor **Bcl6 in T cell development**, enhancing our understanding of immune responses. Finally, we detailed methodologies for detecting protein tyrosine phosphatase interacting partners and contributing to the mapping of signaling pathways in health and disease using **mass spectrometry**.