



Società Chimica Italiana
Divisione di Chimica
Farmaceutica



BOOK OF ABSTRACTS



UNIVERSITÀ
DEGLI STUDI DI BARI
ALDO MORO

XXVII National Meeting on Medicinal Chemistry



14th Young Medicinal Chemists' Symposium
Nuove Prospettive in Chimica Farmaceutica

Palazzo Del Prete, Piazza Cesare Battisti
Università degli Studi di Bari Aldo Moro
September 11-14, 2022

WELCOME MESSAGE

The Scientific and Organizing Committees are pleased to welcome you in Bari for attending the 27th National Meeting in Medicinal Chemistry (NMMC27), organized by the *Medicinal Chemistry Division of the Italian Chemical Society* (DCF-SCI) and sponsored by the *European Federation of Medicinal Chemistry and Chemical Biology* (EFMC). Bari is a beautiful seaside town, rich in churches, palaces, piazzas, theatres and restaurants, with a special charm throughout the year.

NMMC27, jointly with the 14th Young Medicinal Chemists Symposium “Nuove Prospettive in Chimica Farmaceutica” (NPCF14), will give you the opportunity to share views about the challenges around the corner, as well as medicinal chemistry hot topics. After two years of virtual meetings, the 2022 edition of the NMMC/NPCF symposium will be a presential event, although restricted to fully vaccinated individuals.

The meeting will cover advances in drug discovery in major therapeutic areas, including the treatment of bacterial and viral infections, with a particular focus on the emerging COVID-19 pandemics, but also neurodegenerative and cardiovascular diseases, rare diseases, and cancer. In five scientific sessions, artificial intelligence and machine learning techniques as applied to drug discovery, the so-called “new modalities in medicinal chemistry” and the most recent advances in sustainable, chemical and biophysical technologies will be also featured. More importantly, participants will have the chance to establish and strengthen collaborative networks, a key option for successful research.

The meeting starts on September 11th with the Opening Ceremony and continues at the Aula Aldo Moro (Palazzo Del Prete, Piazza Cesare Battisti) from 12 to 14 September 2022. The scientific program will include five plenary and ten keynote lectures, as well as numerous oral and poster presentations. We actively encourage the participation of young scientists through dedicated grants and reduced registration fees.

More than 250 delegates from academia and industry are expected. Upon application, more than forty grants for young people, covering full registration fees and suitable accommodations, have been provided by DCF-SCI and other Institutional Sponsors.

Welcome in Bari!

Prof. Gianluca Sbardella
Scientific Committee Chair

Prof. Maria Laura Bolognesi
President DCF-SCI

Prof. Cosimo D. Altomare
Local Organizing Committee Chair

Scientific committee

Gianluca Sbardella (chair, University of Salerno)
Stefano Alcaro (University of Catanzaro)
Cosimo D. Altomare (University of Bari)
Vincenza Andrisano (University of Bologna)
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Gabriele Costantino (University of Parma)
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Nicola A. Colabufo (University of Bari)
Gabriele Costantino (University of Parma)
Francesco Leonetti (co-chair, University of Bari)
Carlo Franchini (University of Bari)
Marcello Leopoldo (University of Bari)
Orazio Nicolotti (University of Bari)

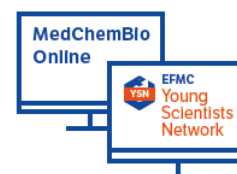
Scientific secretariat

Marco Catto
Enza Lacivita
Giovanni Lentini
Department of Pharmacy – Pharmaceutical Sciences
University of Bari Aldo Moro

Upcoming Events

EFMC-YSN MedChemBioOnline

Webinars mixing science, soft-skills training
& round table discussions
www.efmc.info/efmc-ysn-medchembioonline



17th EFMC Short Course on Medicinal Chemistry

Oegstgeest, The Netherlands | April 23-26, 2023



EFMC-ASMC'25

IX International Symposium on Advances in Synthetic and Medicinal Chemistry

Zagreb, Croatia | September 3-7, 2023



EFMC-YMCS 2023

10th EFMC Young Medicinal Chemists' Symposium

Zagreb, Croatia | September 7-8, 2023



EFMC-ISCB 2023

International Symposium on Chemical Biology

Basel, Switzerland | November 16-18, 2023



Awards

- The Nauta Pharmacochemistry Award for Medicinal Chemistry and Chemical Biology
 - The "UCB-Ehrlich Award for Excellence in Medicinal Chemistry"
 - Prous Institute - Overton and Meyer Award for New Technologies in Drug Discovery
- Visit www.efmc.info/awards for more information

Prizes

- EFMC Prizes for Young Medicinal Chemists in Industry & Academia
- Visit www.efmc.info/prizes for more information

EFMC-YSN

The Young Scientists Network

Building a strong network at an early stage in your career is crucial!

The aim of the EFMC-YSN is to **inspire, connect** and **provide opportunities** to medicinal chemists and chemical biologists in their Early Career.

Visit www.efmc.info/ysn for more information



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SCIENTIFIC PROGRAM

Sunday, September 11 th , 2022	
14.30-17.00	REGISTRATION
	Aldo Moro Hall
17.00-17.45	OPENING CEREMONY Stefano Bronzini – Rector of the University of Bari Aldo Moro Antonio F. Uricchio – President of ANVUR Francesco Leonetti – Head of the Department of Pharmacy-Pharmaceutical Sciences Luigi D'Ambrosio Lettieri – Vice-president of F.O.F.I. Regional Political Authorities Gianluca Sbardella – Chair of the Meeting Maria Laura Bolognesi – President of the Medicinal Chemistry Division Cosimo D. Altomare – Chair of the Local Organizing Committee
17.45-18.15	Medicinal Chemistry Division of the Italian Chemical Society's Awards Francesco Merlino, <i>University of Naples Federico II, Italy</i> Laura Scalvini, <i>University of Parma, Italy</i> Best Doctoral Thesis Awards Design and Synthesis of new PET radiotracers in drug discovery Marco Maspero, <i>University of Milan, Italy</i> Design and synthesis of (pro)electrophilic compounds for investigating the multifactorial nature of neurodegenerative diseases: focus on inflammation-driven events Filippo Basagni, <i>University of Bologna, Italy</i>
18.15-18.45	Musajo Medal of the Medicinal Chemistry Division of the Italian Chemical Society Recipient: Gabriele Costantino , <i>University of Parma, Italy</i> Chair: Maria Laura Bolognesi – President of the Medicinal Chemistry Division
18.45-19.45	PL1: Exploring molecular promiscuity through activity data analysis and explainable artificial intelligence Jürgen Bajorath , <i>University of Bonn, Germany</i>
20.00	WELCOME BUFFET

Monday, September 12th, 2022

	Aldo Moro Hall	
	Chair: Cosimo D. Altomare	
9.00-9.50	PL2: Going with the flow - the use of continuous processing for synthesizing Active Pharmaceutical Ingredients C. Oliver Kappe , <i>University of Graz, Austria</i>	
	Aldo Moro Hall	Vincenzo Starace Hall
	Chairs: Vincenza Andrisano, Orazio Nicolotti	Chairs: Violetta Cecchetti, Stefano Alcaro
10.00-10.30	KN1: Computational approaches to the design of covalent drugs Marco Mor , <i>University of Parma, Italy</i> ChemMedChem Lecture	KN2: Unleashing the potential of Translocator Protein as a therapeutic and diagnostic target: a successful MedChem tale Sabrina Taliani , <i>University of Pisa, Italy</i>
10.30-10.50	OC1: SQM-Score: Universal Quantum-Mechanical Scoring Function for Structure-based Drug Design Adam Pecina , <i>Czech Academy of Sciences Prague, Czech Republic</i>	OC2: Functionalized 6H-dibenzo[c,e]thiazine 5,5-dioxides are potent suppressors of the toxicity mediated by the cellular prion protein Giuseppe Manfroni , <i>University of Perugia, Italy</i>
10.50-11.00	FC1: Machine learning applied to early prediction of drug metabolism Marta Lettieri , <i>S-IN Soluzioni Informatiche srl, Vicenza, Italy</i>	FC2: Extra virgin olive oil extracts enriched in secoiridoids induce an anti-inflammatory profile in PBMCs from obese children Stefania De Santis , <i>University of Bari, Italy</i>
11.00-11.20	COFFEE BREAK	
11.20-11.40	OC3: The 3D-QSAR.COM portal as tool to develop predictive ligand-based and structure-based models for SARS-CoV-2 main protease inhibitors Rino Ragno , <i>Sapienza University of Rome, Italy</i>	OC6: Discovery of orexant and anorexant agents with indazole scaffold endowed with peripheral antiedema activity Adriano Mollica , <i>University of Chieti-Pescara G. D'Annunzio, Italy</i>
11.40-12.00	OC4: Development of a LC-MS platform for monoclonal antibody characterization to assist the production of a rituximab biosimilar from plants Francesca Rinaldi , <i>University of Pavia, Italy</i>	OC7: New class of potential antidiabetes agents targeting DPPIV and CAs enzymes Laura Fumagalli , <i>University of Milan, Italy</i>
12.00-12.20	OC5: A proof-of-concept of the analgesic effect of non-psychotropic <i>Cannabis sativa</i> L. and its main components on peripheral neuropathy Federica Pellati , <i>University of Modena and Reggio-Emilia, Italy</i>	OC8: Towards the characterization of corrector ARN23765 mechanism of action via photo-affinity labeling (PAL) approach Francesco Saccoliti , <i>Italian Institute of Technology, Genoa, Italy</i>
12.30-14.00	LUNCH	
14.00-15.30	POSTER SESSION & COMMERCIAL EXHIBITION	

Monday, September 12th, 2022

	Aldo Moro Hall	Vincenzo Starace Hall
	Chair: Gabriele Costantino, Giovanni Lentini	Chair: Maria Laura Bolognesi, Roberto Di Santo
15.30-16.00	KN3: Synthetic lethality for next generation precision oncology Andrea Cavalli, University of Bologna, Italy	KN4: A nature inspired approach to develop covalent enzyme inhibitors with anti-infective and anticancer activity Paola Conti, University of Milan, Italy
16.00-16.20	OC9: New nicotinamide mimic scaffold allowed nanomolar inhibition of human PARP enzymes Oriana Tabarrini, University of Perugia, Italy	OC11: Broad spectrum metallo β -lactamases inhibitors: new tools against clinically-relevant carbapenemases Loretta Lazzarato, University of Turin, Italy
16.20-16.40	OC10: Spindlin-1 degraders: stairway to heaven (?) Monica Viviano, University of Salerno, Italy	OC12: Novel dipeptide nitriles as antitrypanosomal agents targeting rhodesain of <i>Trypanosoma brucei rhodesiense</i> : development and combination studies Roberta Ettari, University of Messina, Italy
16.40-17.00	COFFEE BREAK	
17.00-17.20	OC13: TRPM8 ion channel: new target in the treatment of castration-resistant prostate cancer (CRPC) Veronica Di Sarno, University of Salerno, Italy	OC15: The PADAM oxidation route for the synthesis of SARS-CoV-2 main protease inhibitors Sveva Pelliccia, University of Naples Federico II, Italy
17.20-17.40	OC14: Challenge transability of "in vitro" to "in vivo": gene-expression biomarkers and fluorescent image-guided surgery probes identification for ovarian cancer Antonio Scilimati, University of Bari, Italy	OC16: Discovery of diketo acid derivatives targeting the SARS-CoV-2 NSP13 helicase Valentina Madia, Sapienza University of Rome, Italy
17.40-17.50	FC3: Combining mass spectrometry and nuclear magnetic resonance for the study of ligand:G-quadruplex interaction Erika Oselladore, University of Brescia, Italy	OC17: An integrated medicinal chemistry workflow for the development of new peptides as SARS-CoV-2 MPro covalent inhibitors Simona Musella, University of Salerno, Italy
17.50-18.00	FC4: Carbazole derivatives as multi-target agents in breast cancer treatment Jessica Ceramella, University of Calabria, Italy	
18.00-19:00	NETWORKING	
	Tavola rotonda Malattia di Lafora: dalla ricerca di farmaci ai diritti dei pazienti <i>Per una stretta cooperazione tra ricerca e assistenza</i> G. d'Orsi, T. Bressanello, G. Annichiarico, A. Liantonio, G. Costantino, C. Altomare	Workshop Why was my paper rejected? Optimizing manuscripts for successful submission and publication David Peralta, Editor-in-Chief ChemMedChem, Wiley-VCH
19:30	CONCERT OF CORUS HARMONIA – BASILICA DI S. NICOLA	

Tuesday, September 13th, 2022

	Aldo Moro Hall	
	Chair: Nicola A. Colabufo	
9.00-9.50	PL3: Innovative strategies to target non-coding RNAs with synthetic ligands Maria Duca, Université Côte d'Azur Nice, France	
	Aldo Moro Hall	Vincenzo Starace Hall
	Chairs: Patrizia Diana, Francesco Leonetti	Chairs: Enza Lacivita, Tiziano Bandiera
10.00-10.30	KN5: Targeting dopamine D ₄ receptor as a thrilling challenge to explore new therapeutic opportunities Fabio Del Bello, University of Camerino, Italy	KN6: Identification of ARN21641, an orally available and CNS penetrant Acid Ceramidase inhibitor with target engagement in mouse models of Gaucher and Krabbe diseases Rita Scarpelli, Italian Institute of Technology, Genoa, Italy
10.30-10.50	OC18: Development of novel enzyme inhibitors of the endocannabinoids' catabolism for the treatment of epilepsy and neuroinflammatory conditions Stefania Butini, University of Siena, Italy	OC19: Hijacking the folding process for targeted protein degradation Andrea Astolfi, University of Perugia, Italy
10.50-11.00	FC5: Targeting the mycobactin biosynthesis pathway in <i>M. tuberculosis</i> : a step towards the improvement of the anti-virulence activity of MbtI inhibitors Matteo Mori, University of Milan, Italy	FC6: Development of hydrogen sulfide-releasing hybrids as novel multitarget drugs Angela Corvino, University of Naples Federico II, Italy
11.00-11.20	COFFEE BREAK	
11.20-11.40	OC20: The pivotal role of pyrrolidine ring as multitarget scaffold in neurodegenerative diseases Antonio Carrieri, University of Bari, Italy	OC23: Nucleic acid aptamers: potential therapeutic agents for cancer and neurodegenerative disorders Jussara Amato, University of Naples Federico II, Italy
11.40-12.00	OC21: Pursuing the complexity of bipolar disorder: rational design and optimization of first-in-class D ₃ R/GSK-3 β modulators towards an in vivo proof of concept Rita M.C. Di Martino, Italian Institute of Technology, Genoa, Italy	OC24: Combining quantum mechanics and machine learning in the search of the bioactive conformation of drug-like compounds Antonio Viayna, University of Barcelona, Spain
12.00-12.20	OC22: S.M.A.R.T. steroids: synthesis and structure-activity relationship study towards allosteric modulators of <i>N</i> -methyl-D-aspartate receptors Eva Kudova, Czech Academy of Sciences Prague, Czech Republic	OC25: Challenging bioisosteric switch in AChE-MAO B dual-targeting hit optimization Leonardo Pisani, University of Bari, Italy
12.30-14.00	LUNCH	
14.00-15.30	POSTER SESSION & COMMERCIAL EXHIBITION	

Tuesday, September 13th, 2022

	Aldo Moro Hall	Vincenzo Starace Hall
	Chair: Giannamaria Annunziato, Laura Scalvini	Chair: Isabella Romeo, Francesco Merlino
15.30-16.00	KN7: From the catalytic mechanism to the enzyme substrate selectivity: a study on <i>N</i> -acylethanolamine acid amidase Laura Scalvini, University of Parma, Italy	KN8: From natural resource to preclinical candidate: our experience with the temporin-derived peptide antimicrobial agents Francesco Merlino, University of Naples Federico II, Italy
16.00-16.10	FC7: Discovery of 2-(4-hydroxy-3,5-dimethylphenyl)- <i>N</i> -(pyridin-2-yl)-1 <i>H</i> -benzo[d]imidazole-6-sulfonamide as BET inhibitor with selectivity for the first bromodomain Alessandra Cipriano, University of Salerno, Italy	FC11: Tetrahydropyran and cyclohexane linked novel bacterial topoisomerase inhibitors with improved balanced antibacterial activity and safety profile Maja Kokot, National Institute of Chemistry, Ljubljana, Slovenia
16.10-16.20	FC8: First-in-class selective inhibitors of the histone acetyltransferase KAT8 Francesco Fiorentino, Sapienza University of Rome, Italy	FC12: Miconazole-like scaffold is a promising lead for developing <i>Naegleria fowleri</i> -specific brain permeable CYP51 inhibitors Valeria Tudino, University of Rome Tor Vergata, Italy
16.20-16.30	FC9: Design, synthesis, and biological evaluation of new hybrid MOR agonist/HDACi compounds: an innovative approach for persistent pain management Giuliana Costanzo, University of Catania, Italy	FC13: Structural modifications of triazine-based compounds for high-efficiency PDK inhibition Camilla Pecoraro, University of Palermo, Italy
16.30-16.40	FC10: Visible-light photocatalytic activity of isocyanides: from the proof-of-concept to the synthetic application in Ugi-like chemistry Camilla Russo, University of Naples Federico II, Italy	FC14: In silico assisted discovery of dual 5-LOX/sHE inhibitors: in vitro characterization and in vivo anti-inflammatory properties Tania Ciaglia, University of Salerno, Italy
16.40-17.00	COFFEE BREAK	
17.00-17.30	In memoriam of Prof. Vincenzo Tortorella (1932-2022) Celebration of retired colleagues	
17.30-19.30	DCF-SCI GENERAL MEETING (ASSEMBLEA DELLA DIVISIONE DI CHIMICA FARMACEUTICA)	
20.30	SOCIAL DINNER AT RISTORANTE ZONNO (Lungomare di Bari)	

Wednesday September 14th, 2022

Aldo Moro Hall	
Chair: Marcello Leopoldo	
9.00-9.50	PL4: Targeting chemokine receptor CCR2 - From insurmountable antagonists to affinity-based probes Laura Heitman, Leiden University, The Netherlands
Aldo Moro Hall Vincenzo Starace Hall Chairs: Marco Catto, Marcello Leopoldo Chairs: Gianluca Sbardella, Cosimo D. Altomare	
10.00-10.30	KN9: Development and hands-on application of PyRMD: a new AI-powered virtual screening tool Sandro Cosconati, Luigi Vanvitelli University, Naples, Italy
	KN10: The discovery of potent and selective agonists of human transient receptor potential Cation Channel Subfamily M member 5: from HTS to early hit validation Alessio Barilli, Aptuit, an Evotec Company, Verona, Italy
10.30-10.50	OC26: exploring CCRL2 Chemerin binding using accelerated molecular dynamics Antonio Coluccia, Sapienza University of Rome, Italy
	OC28: The first in vivo proof-of-concept for the efficacy of selective HDAC6 inhibition in cystic fibrosis: anti-inflammatory profile, effects on bacterial load, formulation and biodistribution studies Margherita Brindisi, University of Naples Federico II, Italy
10.50-11.10	OC27: Functionalized ligands targeting G protein-coupled adenosine receptors Stephanie Federico, University of Trieste, Italy
	OC29: New insights in the development of cannabinoid receptor subtype 2 (CB2R) ligands Marialessandra Contino, University of Bari, Italy
11.10-11.30	COFFEE BREAK
11.30-11.50	OC30: Optimizing the choice of 3D query structures in ligand-based virtual screenings with PharmScreen® Giorgia Zaetta, Parc Científic de Barcelona, Spain
	OC32: Novel cyclic uPA-derived decapeptides reduce in vivo lung dissemination and re-educate CAF phenotype by acting through integrin $\alpha\beta_5$ Alfonso Carotenuto, University of Naples Federico II, Italy
11.50-12.10	OC31: A computational grid-based analysis to map drug-like peptide binding pockets of peptide-protein interactions systems Daniela Trisciuzzi, University of Bari, Italy
	OC33: Screening of amino-acid-anthraquinone click chemistry conjugates targeting human telomeric G-quadruplexes Giovanni Ribaldo, University of Brescia, Italy
Aldo Moro Hall	
Chair: Gianluca Sbardella	
12.10-13.10	PL5: COVID-19 pandemic: what we learnt in antiviral drug discovery, successes, and failures Vincenzo Summa, University of Naples Federico II, Italy
13.10-13.30	CLOSING REMARKS and POSTER PRIZES
13.30	LUNCH

PO-032

IPEROXO/DEQUALINIUM AND W84/DEQUALINIUM HYBRID LIGANDS: SYNTHESIS, PHARMACOLOGICAL AND COMPUTATIONAL INVESTIGATION AT M₂ mAChRs

Papotto, C.;^a Matera, C.;^a Brivio, N.;^a Maspero, M.;^a De Amici, M.;^a Morando, S.;^b Matucci, R.;^b Vistoli, G.;^a and Dallanoe, C.^a

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The use of bitopic ligands to study the properties of Muscarinic Acetylcholine Receptors (mAChRs) is a very active field of research.^{1,2,3} In this regard, biparmacophoric molecular probes were found to switch between two different binding orientations in the M₂ subtype, resulting in both active and inactive populations of receptors bound by a given ligand, a behavior that has been termed dynamic ligand binding.² Continuing our interest in this field, we focused our attention on the properties of Dequalinium chloride, a bis-pyridinium quaternary ammonium compound, which was recently reported to act as a potent muscarinic allosteric modulator, showing an overall selectivity towards the M₂ subtype.⁴ Starting from this observation, we designed and synthesized two series of novel hybrid ligands incorporating in their molecular skeleton the allosteric moiety of Dequalinium (**Figure 1**). The first series is based on the combination of Dequalinium with the orthosteric superagonist Iperoxo and aimed at novel chemical probes interacting cooperatively with both the orthosteric and the allosteric binding site. In the second series, Dequalinium was hybridized with the allosteric modulator W-84, affording new putative allo/allosteric ligands.

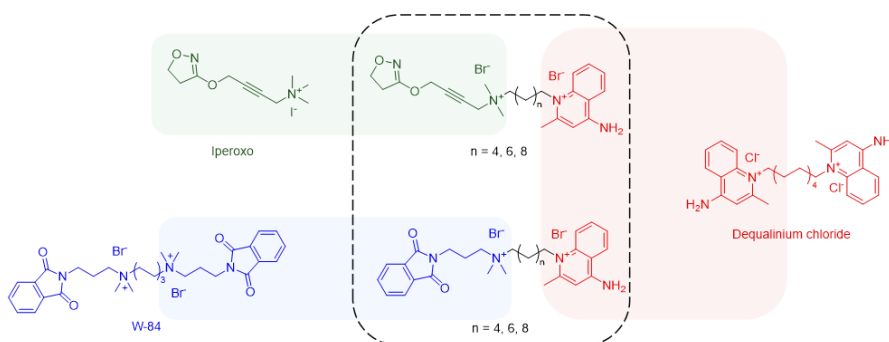


Figure 1: The newly Dequalinium hybrid ligands.

In this study, the newly synthesized compounds have been characterized through competitive binding assays at the five mAChR subtypes. The activity on the allosteric site has been investigated by measuring the affinity (logK_{occ}) at the [³H]-NMS-occupied muscarinic hM₂ subtype. Moreover, docking simulations have been performed to highlight the interactions within the ortho/allosteric binding pockets of the hM₂ crystal structure addressing the role of linker length. The synthetic approach and the details of the pharmacological and computational investigations will be illustrated and discussed.

References

- Holze, J.; Bermudez, M.; Pfeil, E.M.; Matera, C.; Dallanoe, C.; De Amici, M. *et al. ACS Pharmacol. Transl. Sci.* **2020**, *3*, 859–867.
- Bock, A.; Bermudez, M.; Krebs, F.; Matera, C.; Chirinda, B.; Sydow, D.; Dallanoe, C. *et al. J. Biol. Chem.* **2016**, *291*, 16375.
- Bock, A.; Merten, N.; Schrage, R.; Dallanoe, C.; Bätz, J.; Klöckner, J.; Schmitz, J.; Matera, C. *et al. Nat. Commun.* **2012**, *2*, 1044.
- Mazzolari, A.; Gervasoni, S.; Pedretti, A.; Fumagalli, L.; Matucci, R.; Vistoli, G. *Int. J. Mol. Sci.* **2020**, *21*, 5961.