



UNIMORE

UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

Prof. Maria Paola Costi
University of Modena and Reggio Emilia
Department of Life Science
Via Campi 103,
41125 Modena
Italy

CURRICULUM VITAE

Name: Maria Paola COSTI, Ph.D.

Date and Place of Birth 06/26/1959, Modena, Italy

Education:

1984: degree in Chemistry and Pharmaceutical Science, University of Modena, Modena, Italy

1986: degree in Pharmacy, University of Modena,

1989: PhD in Medicinal Chemistry, University of Modena, Modena, Italy.

Brief Chronology of Employment:

- 2013- Full Professor in Medicinal Chemistry (CHIM08), Department of Life Science, University of Modena, Modena, Italy.

- 2000 Associate Professor in Medicinal Chemistry, Faculty of Bioscience and Biotechnology, University of Modena and Reggio Emilia, Italy.

- 1992-1993. Visiting scientist. Department of Pharmaceutical Science, Prof. P.G. Baraldi. University of Ferrara, Ferrara, Italy.

- 1991: Visiting fellow, Department of Biochemistry and Biophysics, Directed by Prof. D.V.Santi. University of California San Francisco, US. Back in the same lab as Visiting scientist in 1994, 1996, 1998, 1999.1990.

- 1990 Researcher position, Department of Pharmaceutical Science, University of Modena, Modena, Italy.

1989 PhD in Pharmaceutical Chemistry, Department of Pharmaceutical Science, University of Modena, Modena, Italy.

TEACHING ACTIVITY

2014 - present: Pharmaceutical Chemistry and Toxicology 2, Course of Chemistry and Pharmaceutical technology (CTF), University of Modena and Reggio Emilia, Italy.

2015- present: Pharmaceutical Biotechnology, Course of Chemistry and Pharmaceutical Technology (CTF), University of Modena and Reggio Emilia, Italy. 2019- 2020: Pharmaceutical Chemistry and Toxicology 2, Pharmacy, UniMORE.

2020-2021 Laboratory of extractive and synthetic preparation of drugs. (CTF course).

2017/2018- 2018/2019: Radiopharmaceuticals, Course of Pharmacy, University of Modena and Reggio Emilia, Italy.

2004 - 2014: Faculty of Biotechnology and Biology, teaching courses held: Biotechnology drugs, Medicinal chemistry and Advanced methodologies in Drug Discovery, Laboratory of biotechnological drugs, protein purification. Analytical chemistry methodologies of biotechnological drugs, Drug targets identification approaches.

1990 - 2004: Faculty of Pharmacy teaching courses held: Analytical Chemistry, Quantitative analysis of pharmaceuticals, Qualitative analysis of Pharmaceuticals, Library design in drug discovery, New methodologies in Drug Discovery.

Faculty of Pharmacy (1990-1998) Analytical Chemistry, Quantitative analysis of pharmaceuticals, Qualitative analysis of Pharmaceuticals, Medicinal chemistry, Drug Design.

School of Doctorate in Health Science teaching topics related to System biology approaches to drug discovery, Chemical space sorting, Medicinal chemistry in parasitology. (1998-2013).

President of the International Committee of the PhD in Parasitology (Granada, 2006), University (Cape Town University, Punjab), University of Ferrara (2013), University of Pamplona (2017). University of Milan (2017), President of the PhD examination Committee, University of Bologna 23 March 2021.

STUDENTS and POSTODOC SUPERVISION

PhD students tutoring (32 students).

Thesis degree students: 145 from the CTF, Biotechnology and Biology courses.

She is actively teaching in different Doctorate School and specialization courses.

Past Students/postdoc Career

2014-2018 **Chiara Borsari**, postdoc position Department of Biomedicine, University of Basel

2014-2018 **Pasquale Linciano**, post doc position for 4 years at Unimore, Research position tenure track in Medicinal Chemistry at UNIMORE (ricercatore di tipo B);

2015-2018 **Antonio Quotadamo** PhD student at Unimore, now he has a position as Research And Development Scientist MedChem at IRBM, Rome, Italy;

2015-2018 **Leda Severi**, PhD student at Unimore, now she has a position as Clinical Trial Associate presso Holostem Terapie Avanzate S.r.l. Modena Italy;

2012-2018 **Matteo Santucci** PhD student and post-doc Dep. Biotechnology-University of Verona

2008-2011 **Laura Cancian**, PhD student, Dirigenza non medica - assunto dal 01/02/2012. dirig.farmacista - farmacia ospedaliera

2006-2009 **Cardinale, Daniela**, PhD student at Unimore research position at Laboratory Manager at UCL GOS Institute of Child Health;

2006-2009 **Giambattista Guaitoli** PhD student at Unimore, now Postdoc als Wissenschaftler Mitarbeiter at DZNE - German Center for Neurodegenerative Diseases, Stuttgart;

2004-2006 **Federico Cavallari**, Degree in Pharmaceutical Biotechnology, now Responsabile Laboratorio e R&D presso Gruppo Fabbri Vignola, Italy;

2003-2006 **Federica Morandi**, PhD student at Unimore, 2019 (only tutoring)- Section Head, Cellular Assays at Roche, Zurigo;

2003-2006 **Losasso Valeria**, Degree in Pharmaceutical Biotechnology, Unimore. 2012-today Senior Computational Scientist at STFC Daresbury Laboratory (UK);

2000-2006 **Alberto Venturelli**, PhD student, Unimore; research position tenure track in Medicinal

Chemistry at UNIMORE (ricercatore di tipo B);

2000- 2018 **Stefania Ferrari**, PhD Student and then postdoc at Unimore, research position as RTD A;

1990-1996 **Giuseppe Chiericatti**, Degree in CTF, University of Modena, now Managing Director at Chiesi Espana, Barcelona.

SCIENTIFIC ACTIVITIES

Research Activities

The most of my work is focused on drug discovery and development of anticancer and antinfective agents. The discovered compounds are directed to the FOLATE PATHWAYS in different organisms (human, parasites, bacteria and mycobacteria). More recently I become involved in translational research in drug discovery in ovarian cancer (OC) and colorectal cancer (CRC). Evolving projects are on YAP/TAZ-TEAD complexes modulation and TRAP1/HSP90 inhibition in the field of anticancer drug discovery.

My research activity is performed in collaboration with Senior Scientists from UNIMORE (G.Ponterini, Stefania Ferrari, L.Costantino, G.Marverti, Domenico D'Arca, Lorena Losi, up to 2020) and more recently with G.Ponterini, G.Marverti, Domenico D'Arca, Lorena Losi, and Alberto Venturelli. We have built an integrated lab with expertise in synthetic chemistry, biophysical chemistry, cellular biology and molecular biology and Mass Spectrometry. International collaborations reported in particular related to the European projects and Italian Association for Cancer Research projects (AIRC) listed in other sections. The activity is reported at the following website: www.mariapaolacosti.com.

1. Thymidylate synthase enzymes structure, function and inhibition.

Thymidylate synthase (TS) is one of the most conserved enzymes known in the evolutionary course. It is a well-known target in anticancer chemotherapy. We have recently identified peptides and small molecules acting as monomer-monomer interface binders with a particular activity as dimer disrupters as dimer dissociating ligands.

2.Folate related enzymes involved in parasitic diseases.

Pteridine reductase (PTR1) is a specific folate dependent enzyme in *Trypanosoma cruzi* metabolism with salvage pathway activity with respect to dihydrofolate reductase (DHFR). For an effective antifolate-base chemotherapy a combination of Dihydrofolate reductase and Pteridine reductase inhibition should be achieved. Our aim is to discover new specific PTR1 inhibitor that completely block the dihydrofolate reductase activity in the parasite, when combined with well-known antifolate targeting DHFR. We have identified two main leads and one drug lead, with a strong activity and low toxicity in four animal models. This compound is in development as anti-leishmania agent for dogs leishmaniasis.

3. Design and Development of YAP-TEAD system modulator as anticancer agents.

Drug discovery programs directed to the Hippo Pathway targets are of high relevance for pharma, but the work published does not account for a sufficiently extended efforts in the number and molecular diversity of drug candidates identified to ensure the development of a clinical candidate. The limited knowledge of its structural biology prevents the accurate design of relevant inhibitors. Our activity is focused on the discovery of ligands targeting the omega loop (interface 3) of TEAD. We have published 2 review and one research paper is under revision.

4. Translational research in pharmaceutical chemistry in which we perform proteomics studies. I participate, and have the responsibility in a few, in translational clinical trials within the MITO network (Italian Multicenter for Ovarian Cancer), the EUTROC network and in collaboration with Dr. Ugo de Giorgi oncology department IRCSS, Meldola, (FO)). Proteomic studies are performed in collaboration with Prof. Fulvio Magni of Bicocca University, Milan and at CIGS UNIMORE. These studies have several objectives: they can allow the identification of biomarkers of drug response during clinical therapies, they can facilitate the proposal of new drug combinations, the understanding of the mechanism of action of drugs

and the identification of new clinical targets for anticancer therapy. This last aspect allows the design of new drug discovery programs conceptually based on clinical research and therefore with greater prospects of therapeutic efficacy.

5. Novel Beta-Lactamase inhibitors. (Limited activity on this topic recently)

Beta-lactamases are well known enzymes in resistance problems because they are responsible of the increasingly evolution of bacteria that do not respond to the penicillin and cephalosporin family of antibiotics. To overcome this action, beta-lactam-based molecules that inhibit (e.g., clavulanate) or are stable to their action (e.g., aztreonam) have been developed. Many bacteria are now resistant to these anti-resistance compounds. Our aim is to discover new molecules to overcome this resistance problem in order to have compounds that show antibiotic/coadjuvant action in drug resistance chemotherapy blocking beta-lactamase enzymes.

165 papers, 93 within the 2012 and 2021, 7 book chapters

Editorials

1. COSTI M. (2005). *Drugs Against Protozoan Parasites: Target Selection, Structural Biology and Medicinal Chemistry*, Copper Mountain, CO, USA, 9-13 April 2005. Di - THOMSON SCIENTIFIC LTD IDDB INVESTIGATIONAL DATABASE HTTPWWW.IDDB.COMIDDB. (vol. 3 May 2005). On line Journal. : Thompson scientific (UNITED KINGDOM).
2. Collaboration to Encyclopedia compilation *Encyclopedia of Cancer*, <http://www.springerreference.com> on the Chapter "Drug resistance to platinum drugs in Ovarian Cancer".
3. *Hits and leads for human African trypanosomiasis*. DRUG TARGET REVIEW | Winter 2017, Issue 04. (Hit-to-Lead In-Depth Focus (pages 38-41), Sheraz Gul, Giulia Pasini, MPCosti.

Book Chapters

1. Hits and Lead discovery in the identification of new drugs against the trypanosomatidic infections. Theodora Calogeropoulou, George E. Magoulas, Ina Pöhner, Joanna Panecka-Hofman, Pasquale Linciano, Stefania Ferrari, Nuno Santarem, M Dolores Jiménez-Antón, Ana Isabel Olías-Molero, José María Alunda, Anabela Cordeiro da Silva, Rebecca C. Wade and **Maria Paola Costi** "MEDICINAL CHEMISTRY OF NEGLECTED TROPICAL DISEASES. Advances in the design and synthesis of antimicrobial agents" to be published by CRC Press, Taylor & Francis Group. 2019.
2. Scaffolds and biological targets avenue to fight against drug resistance in leishmaniasis. Chiara Borsari, Antonio Quotadamo, Stefania Ferrari, A. Venturelli, Anabela Cordeiro, Nuno Santarem, **Maria Paola Costi**. Annual Review in Medicinal Chemistry. Volume 51. DOI: 10.1016/bs.armc.2018.08.002
3. Series Editor for *VITAMINS & HORMONES* (Academic press/Elsevier), VH Volume 107: AID 146) entitled **OVARIAN CYCLE**. Chapter entitled "HUMAN THYMIDYLATE SYNTHASE INHIBITORS halting OVARIAN CANCER CELL GROWTH. **M.P.Costi** et al. 2018;107:473-513. doi: 10.1016/bs.vh.2017.12.002.
4. Costi Maria Paola, Pellati Federica, Ferrari Stefania (2013). Protein-protein interaction inhibitors: case studies on Small Molecules and Natural Compounds. In: **Maria Paola Costi**, Stefania Ferrari Federica Pellati. Disruption of Protein-Protein Interfaces. p. 31-60, Berlin Heidelberg:Stefano Mangani, ISBN: 9783642379987.
5. Trypanosomatid Diseases. A molecular route to drug discovery. Edited by Timo Jäger, Oliver Koch, Drug Discovery in Infectious Diseases. Volume 4 Series Editor Paul M. Selzer. Wiley-Blackwell 2013. Medicinal chemistry approaches targeting the trypanosomatidic enzymes Pteridine reductase and Dihydrofolate reductase. In Press. ISBN 978-3-527-33255-7. Stefania Ferrari, Valeria Losasso, Puneet Saxena, **Maria Paola Costi**.
6. Enhancing the drug discovery process by integration of structure-based drug design and combinatorial synthesis. In: ARUP K. GHOSE, VELLARKAD N. VISWANADHAN. Combinatorial Library Design and Evaluation Principles, Software, Tools, and Applications in Drug Discovery. D.Tondi, **Costi M.P.**(2001). ISBN: 0-8247-0487-8. NEW YORK CITY: Marcel Dekker, Inc. (UNITED STATES).

For more info on the research group, scientific profile and publications access the following websites:
<http://www.scifar.unimo.it/web/costi/>, www.mariapaolacosti.com,
<https://www.researchgate.net/profile/Maria-Costi>, Costi Maria Paola google scholar.

NATIONAL AND INTERNATIONAL MOST RECENT COLLABORATIONS (not exhaustive list)

Dr. Sheraz Gul Fraunhofer, Hamburg (DE).
Dr. Joachim Clos, BNI, Hamburg (DE).
Prof. Anabela Cordeiro IBMC, Porto, (Pt).
Prof. R.Stroud, University of California San Francisco, USA.
Prof. Rebecca Wade EML e EMBL, Heidelberg, (DE).
Dr. Francisco Gamarro, Istituto di Parasitologia Lopez Neyra, Granada, Spain.;
Prof. Gabriele Cruciani, Molecular Discovery (UK).
Prof. Stefano Mangani, Unisi, Siena, I
Dr. Cecilia Pozzi, Unisi, Siena I
Prof. Remo Guerrini, Unife, Ferrara, I
Dr. Sean Ekins, Collaborations Pharmaceuticals, Inc.
Prof. Fulvio Magni, Università Bicocca, Milano, I
Prof. Theodora Calgeropoulou, NHRF, Athens.
Prof. Josè Maria Alunda, University Complutense Madrid (UCM).
Dr. Sandro Pignata ITN, (MITO) Naples Italy.
Prof. Michele Tonelli UniGE, I
Others

ACADEMIC/SCIENTIFIC ADVISORS ROLES

2022 – Director of the second level Master in “Development, manufacturing and Authorizations of Bio pharmaceuticals” Department of Life Science, University of Modena and Reggio Emilia. (www.masterbiopharmaceuticals.it)

2021 – Member of the council of the regional school Parma Summer School in Advanced School in Drug Research and Development “Integrating Structural and Biophysical Data in Drug Discovery in the AI era”

2021 – Member of the Council of Giunta di Dipartimento for the Department of Life Science, University of Modena and Reggio Emilia

2020 – **today** Member of the board of directors of the Biotechnology Interdivisional Group (GIB) of the Italian Chemical Society (SCI) (<http://www.soc.chim.it/it/gruppi/biotechnologie/direttivo>).

2020 – **2021** President of the commission for State examination for pharmacists.

2019 – **2021** National working group on reviewing the Medicinal Chemistry courses. (SCI-Italian Chemical Society Medicinal Chemistry Division)

2019 – **today** Representative member for UNIMORE at the Paul Erlich MedChem, Euro PhD Network. [http://www. Perlichmedchem.eu](http://www.Perlichmedchem.eu)

2020 – **2021** President of the commission for State examination for pharmacists.

2020 – **2021** Member of Commissione monitoraggio Degree course in Pharmacy.

2014 – **today** Member of the Council of Comitato di indirizzo for the course in Chemistry and pharmaceutical technology.

2012–2015 President of the Regional PhD program named NOVAMOLSTAM. Project topic: Discovery of new tools to control stem cells growth and differentiations and for anti-cancer drug discovery applications

2012 – **today** Member of the Council of the School of Doctorate in Clinical and Experimental Medicine at Unimore.

2004–2012 UNIMORE working group on Biotechnology faculty organization and monitoring.

MPC covered the role of project Coordinator /responsible of 30 projects in the years 1999-today (see below **PROJECTS GRANTED** section)

NATIONAL/INTERNATIONAL ROLE COVERED

2022 – 2026 Main proposer and COST Action chair candidate of the COST Action CA21111 entitled “*One Health drugs against parasitic vector borne diseases in Europe and beyond* (OneHealthdrugs) <https://www.cost.eu/actions/CA21111/>

2022-2027 PI of the AIRC (Associazione Italiana per la Ricerca sul Cancro) IG 25785 project “*Thymidylate synthase dimer disrupters induce DNA damage halt cell growth overcome drug Resistance in colorectal cancer*”.

2021 – Director of the second level Master in “Development, manufacturing and Authorizations of Bio pharmaceuticals” Department of Life Science, University of Modena and Reggio Emilia. (www.masterbiopharmaceuticals.it)

1990 - today. PI of the Laboratory of Drug Discovery and Biotechnology at the Department of Life Science at University of Modena (UNIMORE). <http://personale.unimore.it/rubrica /dettaglio/costimp2019-2019-2019-2021>

2019 – today. Representative member for UNIMORE at the Paul Erlich MedChem, Euro PhD Network. <http://www.Prlichmedchem.eu>

2019 - today. Member of European Science Foundation (ESF) College of Expert Reviewers (www.esf.org).

2015-2018. PI of AIRC (Associazione Italiana per la Ricerca sul Cancro) (Italian Association for Cancer Research) project IG 16977 “Protein-protein interaction inhibitors of thymidylate synthase against colorectal cancer”.

2014-2017. Coordinator of the FP7 European Commission project “New medicine for Trypanosomatidae infections, NMTrypl” collaborative project within INNOVATION 1 topic.

2015-2017. Co-coordination and organization of the synergy activities among the four EU running projects in the field of Neglected Tropical Diseases (A-ParaDDisE, KINDReD, NMTrypl and PDE4NPD).

Meetings organizations, reports writing and transmission to the EU Officers.

([https://www.cell.com/trends/parasitology/comments/S1471-4922\(17\)30108-3](https://www.cell.com/trends/parasitology/comments/S1471-4922(17)30108-3)).

2013-2015. Scientific manager of the FP7 project “Optobacteria” from the Capacity FP7 program. Grant agreement n°286998. www.optobacteria.org

2013-2015. FP7 project “Optobacteria” from the Capacity FP7 program. Grant agreement n°286998. www.optobacteria.org. Role: PI for Unimore unit.

2002, 2004, 2006, 2009, 2012. PRIN projects research Unit PI, Italian Project on Anti-cancer and anti-parasitic drug discovery focused on the Medicinal chemistry drug discovery of anti-cancers and anti-parasitic agents, Modena unit, (MIUR-COFIN project).

2012-2015. President of the Regional PhD program named NOVAMOLSTAM. Project topic: Discovery of new tools to control stem cells growth and differentiations and for anti-cancer drug discovery applications.

2014-2018. European COST ACTION CM1307 on Targeted chemotherapy towards diseases caused by endoparasites. Role: Management committee (MC) representater for Italy Action and Vice Chair WG1 leader for Medicinal Chemistry.

2008-2012. Participation to the European COST ACTION CM801. Drug development for parasitic diseases. Role: Management committee (MC) substitute representer for Italy.

2004-2007. Participation to the European COST ACTION B22 - Drug development for parasitic diseases. Role: Management committee substitute for Italy.

2010 – today. Member of Translational research section, MITO association (Multicentro italiano per il tumore ovarico) (Ovarian cancer Italian Multicenter).www.mito-group.it

2009-2018 Co-Founder and scientific board member of the European network for translational research in ovarian cancer (EUTROC). From 2009. Legal entity founded on 2011.

2010-2014. PI of the AIRC (Associazione Italiana per la Ricerca sul Cancro) IG 10474 project "Targeting drug resistance in ovarian cancer". Subject: Target ovarian cancer cells that overexpress Folate receptor alfa.

2006-2009. Coordinator of the FP6 - European Commission STREP project "LIGHTS" (Ligands to Interfere with human Thymidylate synthase, www.lights-eu.org). Grant agreement n°037852. www.lights-eu.org.

2003-2006. Coordinator of the FIRB (Finanziamento Italiano per la Ricerca di Base) project on the Discovery of new anti-Trypanosomatidic drugs.

OTHERS

- 2021 Invited seminar "Brevetti, vaccini e salute pubblica. Evento organizzato dalla ACCADEMIA NAZIONALE DI SCIENZE LETTERE E ARTI DI MODENA SEZIONE DI SCIENZE MORALI, GIURIDICHE E SOCIALI.
- 2016 Invitation to the Italian day on Cancer Research (AIRC day), Presidency of the Italian Republic Quirinale. (October 24, 2016).
- 2016 Towards a Culture of Health that Is Welcoming and Supportive at the Service of People with Rare and Neglected Pathologies PONTIFICIUM CONSILIUM PRO VALETUDINIS ADMINISTRIS 11-12 November. Vatican City. Role: session moderator.
- Faculty of 1000 nomination: f1000prime article recommendations "2-carboxyquinoxalines kill mycobacterium tuberculosis through noncovalent inhibition of dpre1." J et al. ACS Chem Biol. 2014.
- Indian Institute of Technology Bombay (ITTS), Mumbai India, award for the best researcher in Medicinal Chemistry in 2014.
- X-ray crystal structure published in JACS 2005 (codice 1XGJ) received the highest number of downloading in the year from PDB Overall (2007-08: 2008-11). 134.000 downloads.
- 2006 Tydock-Pharma co-founder.
- Technological Innovation Carpi (Modena), (July 2005) and Modena StarCup (October 2005) award for Tydock.
- 2006. Listed in the PNI selected project (Premio Nazionale Innovazione, National Prize for Innovation, Padova, Dicembre 2005. <http://www.premioinnovazione.it/>).
- European School of Medicinal Chemistry, best poster prize (Urbino, Luglio 2004).
- Spinner award for regional competition in technological transfer Emilia Romagna, 2004.
- 2003 Prize MIPTEC- Basel Award for the best poster, March 2003 "Developing New Beta-Lactamase inhibitors through structure-based design and pharmacokinetic properties improvement"
- 18 patents, 2 of them transferred to pharma companies. 13 granted.

RESPONSABILITIES OF PROJECTS IN COLLABORATION WITH TYDOCK PHARMA SRL.

2011-2015 Italian unit of the large collaborative 7FP project. (FP7, MM4TB, HEALTH.2010.2.3.2-1) (GA260872) "More Medicine for Tuberculosis (MM4TB)". Role: scientific manager.

2012-2013 Progetto Distretti 2 in collaboration with Tydock Pharma, Gemib, ReSense. Dai distretti produttivi ai distretti tecnologici. Distretto n.5 Farmaceutica e Biotecnologie. Identificazione di nuovi Biomarker in Oncologia.

2009-2011 International project coordinator SMART per SME EUROTRANSBIO 3rd call. "Specie specificity management in resistant infectious diseases targeting Thymidylate synthase." Role: Scientific manager.

Important citations of published papers:

1. Research highlights di Nature drug discovery volume 7 April 2008. Regarding the paper PNAS 2008-Costi on Pteridine reductase inhibitors discovery.
2. SciBiX Pteridine reductase (PTR1); dihydrofolate reductase (DHFR) Science-Business eXchange 1, (21 February 2008) doi:10.1038/scibx.2008.90 Distillery: Therapeutics. SciBX: Science-Business eXchange. EISSN: 1945-3477.
3. SciBiX Pteridine reductase (PTR1); dihydrofolate reductase (DHFR) Science-Business eXchange (13 January 2011) doi:10.1038/scibx.2011.47 Distillery: Therapeutics. SciBX: Science-Business eXchange.
4. 2011. AIRC-DROC citation in occasion of Bilancio 2011, for the paper Cardinale D, Guaitoli G, Tondi D, Luciani R, Henrich S, Salo-Ahen OM, Ferrari S, Marverti G, Guerrieri D, Ligabue A, Frassinetti C, Pozzi C, Mangani S, Fessas D, Guerrini R, Ponterini G, Wade RC, Costi MP. Protein-protein interface-binding peptides inhibit the cancer therapy target human thymidylate synthase. Proc Natl Acad Sci U S A. 2011 Aug 23;108(34):E542-9.
5. 2012. AIRC-DROC citation in occasion of Bilancio 2012, for the paper Carosati E, Tochowicz A, Marverti G, Guaitoli G, Benedetti P, Ferrari S, Stroud RM, Finer-Moore J, Luciani R, Farina D, Cruciani G, Costi MP. Inhibitor of ovarian cancer cells growth by virtual screening: a new thiazole derivative targeting human thymidylate synthase. J Med Chem. 2012 Nov 26;55(22):10272-6.
6. Faculty of 1000 nomination: **f1000prime article recommendations** "2-carboxyquinoxalines kill mycobacterium tuberculosis through noncovalent inhibition of dpre. J, Hartkoorn R, Costi MP*, Riccardi G*, Cole S.*, ACS Chem Biol. 2014.
7. 2017. Project NMTrypl. News in brief. European Commission news. http://cordis.europa.eu/project/rcn/109924_en.html

Recent INVITED SPEAKERS

1. Advanced School in Drug Research and Development "Integrating Structural and Biophysical Data in Drug Discovery in the AI era" Parma, 29th August – 30th September 2022. Lecture entitled "Chemical Biology for Drug Discovery".
2. Winter Medicinal Chemistry meeting Jan 2022. Oral communication entitled: oc04 – "Dissociative inhibitors of thymidylate synthase homodimer accelerate its proteasomal degradation and inhibit cancer growth in vivo" of the 3rd Alpine Winter conference on Medicinal and Synthetic Chemistry as an online event from January 24-28, 2022. https://www.alpinewinterconference.org/produits.php?langue=english&cle_menus=1238917267&cle_data=1360153578&output=4
3. Drug Discovery Symposium on Targeted therapeutic approaches against cancer and Nanocarriers Development and ageing. International Virtual meeting. Institute of Chemical Biology | National Hellenic Research Foundation. Lecture entitled "Triggering homodimeric protein dissociation for design of anticancer leads". http://www.eie.gr/nhrf/institutes/icb/news/2021/2021_06_14_Symposium_DrugDiscovery.pdf.
4. Invited speaker: PhD course Genova seminars "Antiparasitic drug discovery on the road to phase 1 candidates." 1 MARCH 2021. WEBINAR (4 HRS).
5. Invited Speaker ISNTD 24-02-2021. Drug discovery and future development of medicines against visceral leishmaniasis. <https://www.youtube.com/watch?v=wRdGr88atMA>
6. Invited Speaker ISNTD 06-06-2020. Drug discovery and future development of medicines against visceral leishmaniasis: lessons learned from the Synergy European projects platform & new actions. Pr. Maria Paola Costi (Drug Discovery & Biotechnology Lab, University of

Modena & Reggio Emilia UNIMORE). <https://www.isntd.org/isntd-connect.Tuesday June 9th 2020>

7. MedChem2019 Paul Ehrlich Euro-PhD Network & MuTaLig, COST Action meeting Complesso Monumentale San Giovanni Catanzaro (Italy), June 13th-15, 2019. "Protein-protein interaction studies on thymidylate synthase leads to the identification and characterization of interface inhibitors as anticancer agents"
8. Gordon Research Conference attendance. "High Throughput Chemistry and Chemical Biology. Advances in Chemistry and Chemical Biology to Expand the Druggable Proteome". June 2-7, 2019, Colby-Sawyer College.
9. Invited speaker at the Folate Receptor Society meeting Taormina. Dimer disrupters of Thymidylate synthase through folate receptors targeting. 1-4 October 2018. Proceedings in" Frigerio, B., Bizzoni, C., Jansen, G. et al. Folate receptors and transporters: biological role and diagnostic/therapeutic targets in cancer and other diseases. J Exp Clin Cancer Res38, 125 (2019). <https://doi.org/10.1186/s13046-019-1123-1>
10. Invited speaker YAP/TAZ and TEAD: At the Crossroads of Cancer II, 2018. YAP-TEAD complex inhibitors discovery and development to interfere with ovarian and colon cancer cell growth" Telluride Center for Research and Analysis of Vascular Tumors, CRAVAT Foundation. 25-30 June 2018.
11. Invited speaker YAP/TAZ and TEAD: At the Crossroads of Cancer II, 2017. YAP-TEAD complex inhibitors discovery and drug repurposing." Telluride Center for Research and Analysis of Vascular Tumors, CRAVAT Foundation. 30/7-4/08 2017.
12. Invited Speaker "Protein quest: how to target thymidylate synthase to disclose cancer cell inhibition patterns" *One-Day Course: Proteins as drug target, proteins as drug, and protein degradation as therapeutic strategy. Organized by the Group Protein of the Italian Biochemical Society and the Division of Medicinal Chemistry of the Italian Chemistry Society.* May 8, 2017, Centro S. Elisabetta, Viale delle Scienze 95, Campus, University of Parma, Parma.
13. Invited speaker ESMEC (European School of Medicinal Chemistry) lecture entitled " Medicinal Chemistry in parasitology." 2015

AWARDS

- 1987 NATO participation Grant to Advanced Course: "Antiviral drug development: a multidisciplinary approach" Scientific Committee: Prof. E. de Clerk
- 1991 CNR Grant for visiting Prof. Daniel V. Santi laboratories (UCSF, USA)
- 1994 UCSF Grant for visiting and collaboration according to Prof. I.D. Kuntz Pharmaceutical Science Department, UCSF, USA
- 1996 UCSF Grant for visiting Prof. Daniel Santi laboratories (UCSF, USA)
- 1996 NATO participation Grant to Advanced Course: "International School of Crystallography; Experimental and computational approach to the structure-based drug design" Scientific Committee: Prof Penelope Codding.

EXTERNAL REVIEWER

2022—Research Foundation Flanders (FWO). FWO Review College member.

2019—European Science Foundation, member of the panel reviewer F.R.S.-FNRS expert (Fund for Scientific Research-FNRS, Belgium)

a) Grant award peer reviewer Expert evaluator of the European Commission for the V, VI, VII framework research program (5FP, 6FP, 7FP, Horizon2020). Expert reviewer for National projects. MAP (Minister for Productive Activity), MIUR. Peer Reviewer some international organizations such as CNRS, Polish academy, French agency ANR, Polish National Research grant agencies, FRG21-UAE.

b) Peer reviewer per NATURE, Lancet infectious disease, Chemical Review, Journal of Medicinal Chemistry, Redox Biology, Clinical and Translational Medicine, Current Pharmaceutical Design, Biochimica Biophysica Acta, European Journal of Medicinal Chemistry, Bioorganic& Medicinal Chemistry, Biochemistry, Parasitology, Journal of Molecular recognition, Chemistry and Biology, Bioinformatics, Journal Molecular Biology, Journal of Physical Chemistry, ChemMedChem, Free Radical Biology and Medicine, Chemical Biology & Drug Design.

c) Editorial board membership: ACS Medicinal Chemistry Letters, Current Medicinal Chemistry, Mini Review in Medicinal Chemistry and Arkivoc.

MEETING ORGANISATIONS

- 2021. Co-chair of the RDPA (recent development in pharmaceutical analysis) congress, 5-8 September 2021 <https://www.rdpa2021.unimore.it>
- 21-22 July 2021. One health drug discovery in parasitic disease virtual meeting. Unimore.
- June 2016. SYNERGY MEETING OF FP7-HEALTH-2013-2.2.4-2 held in Modena http://cdm.unimo.it/home/dipfarm/costi.mariapaola/NPDs_Synergy-meeting_2016_home.html
- COST CM0801 on Drug development in neglected diseases, Training school on assay development in medicinal chemistry, December 2011.
- COST CM0801 on Drug development in parasitic diseases, annual meeting organization, October 2011. 8.COST CM0801 on Drug development in neglected diseases, Training school on assay development in medicinal chemistry, December 2011.
- Drug Resistance in Ovarian Cancer: biomarkers and treatments. MODENA 19-20/2/2009.
- Swiss-Italian meeting on Medicinal Chemistry, September 2005.
- February 20, 2007 "Medicinal Chemistry in Parasitology", Dipartimento di Scienze Farmaceutiche
- May 22, 2002 "Beta-Lactamase Meeting", Dipartimento di Chimica-Dip.Scienze Farmaceutiche,
- November 25, 2002 "Meeting on infectious diseases. Istituto de Parasitologia Lopez Neyra. In collaboration with Prof.Gamarro, Granada.
- January 23, 2004 "Medicinal Chemistry in Parasitology", Dipartimento di Scienze Farmaceutiche

TECHNOLOGY TRANSFER ACTIONS

a) Activities in preparation to spin-off foundation

Spinner award for regional competition in the ambit of technological transfer, Emilia Romagna, 2004. - Innovative enterprise Carpi, award for Tydock, July 2005. -Innovative enterprise Modena, StarCup Modena e Reggio Emilia award for Tydock, October 2005. -Listed in the PNI selected project (Premio Nazionale Innovazione, National Prize for Innovation, Padova, December 2005 <http://www.premioinnovazione.it/>). This work led to the funding of the spin-off Tydock Pharma srl, a biotech research based on drug and tools discovery and development for technological applications.

b) July 2006-Foundation of the TYDOCK PHARMA srl spin-off. Website www.tydockpharma.com. Role: scientific expert

c) 2020 Co-founder QuadrEL srl innovative enterprise for drug development in the field of drug discovery and development in parasitic diseases.

c) 18 PATENTS

1. Costantino Luca, Maria Paola Costi, Linciano Pasquale, Stefania Ferrari, Anabela Cordeiro Da Silva. COMPOSTI AD ATTIVITA' ANTIPARASSITARIA ITALIAN PATENT NUMBER. N. 102019000003807. **Granted-LIVE.** (2018)
2. NUOVE MOLECOLE AD AZIONE ANTIPARASSITARIA. Italian patent. NUMERO 1020170000 28966, March 16, 2017. **Granted-LIVE.**
3. Costantino Luca, Costi Maria Paola, Ponterini Glauco, Gaetano Marverti, Franchini Silvia, Tondi Donatella, D'Arca Domenico, Ferrari Stefania, Luciani Rosaria, Venturelli Alberto, Sammak Susan, Lauriola Angela, Gozzi Gaia. (2015). ANTICANCER DRUGS. 102015000088249, Università di Modena e Reggio Emilia. **Granted-LIVE.**
4. Costi Maria Paola, Marverti Gaetano, Cardinale Daniela, Venturelli Alberto, Ferrari Stefania, Ponterini Glauco (2014). Peptides binding to the dimer interface of thymidylate synthase for the treatment of cancer-US8916679 "B2 - Granted patent as second publication". US8916679, UNIMORE and HITS (Heidelberg) (DE). **Granted-LIVE**
5. Costi Maria Paola, Stefania Ferrari, Puneet Saxena, Alberto Venturelli, Davide Farina, Luciani Rosaria, Gadupudi Ramakrishna (2014). QUINOXALINE DERIVATIVES AS ANTITUBERCULOSIS AGENTS. MI2014A001983, TYDOCK PHARMA S.R.L. Strada Gherbella 294/B 41126 MODENA MO and ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (EPFL) EPFL-TTO EPFL Innovation Park J 1015 LAUSANNE Svizzera. **Granted**
6. COSTI Maria Paola - COSTANTINO Luca, SAMMAK Susan - PONTERINI Glauco - FERRARI Stefania - LUCIANI Rosaria, FARINA Davide Salvatore Francesco, FRANCHINI Silvia - SANTUCCI Matteo, CRUCIANI Gabriele - CAROSATI Emanuele - NUOVE MOLECOLE, PER USO COME AGENTI ANTITUMORALI, 22 gennaio 2013 al n. MI2013A000085. **Granted-LIVE**
7. Costi MP, Wade R, Henrich S, D, Montejeunes, Ferrari S, Venturelli A, Lazzari S, Guerrieri D., Nerini E., 2010 USO DI INIBITORI DELLA PTERIDINA REDUTTASI PER LA PREVENZIONE E/O IL TRATTAMENTO DI INFEZIONI PARASSITARIE, Titolare: UNIMORE, HITS-EML, N°brevetto: MI2010A002191. **Granted.**
8. Stefano Mangani, Cecilia Pozzi, Stefania Ferrari, Maria Paola Costi, 2009 STRUTTURA DEL CRISTALLO DEL COMPLESSO DI TIMIDILATO SINTETASI (TS) CON UN LIGANDO, Titolare: UNIMORE and UNISI, N° brevetto: MI2009A002117,
9. M.P.Costi, G.Ponterini, G.Marverti, D.Cardinale, A.Venturelli, S.Ferrari, 2009 PEPTIDES BINDING TO THE DIMER INTERFACE OF THYMIDYLATE SYNTHASE FOR THE TREATMENT OF CANCER, Titolare: UNIMORE, Italy; European Media Laboratory, Germany, N° brevetto: PCT/IB2009/055439. **Granted.**
10. M. P. COSTI; G.PAGLIETTI, 2008 SPECIFIC INHIBITORS OF PTERIDINE REDUCTASE WITH ANTIPARASITIC ACTION, Titolare: TYDOCK PHARMA s.r.l., N° brevetto:WO/2009/080367. **Granted.**
11. F.GENOVESE; S. FERRARI; M. P. COSTI; G. PONTERINI, 2008 METODO PER LA FUNZIONLIZZAZIONE SITO SPECIFICA DI MOLECOLE PROTEICHE. Titolare: UNIVERSITA DI MODENA E REGGIO EMILIA, N° brevetto: MI2008A001493.
12. SHOICHET; BRIAN K.; COSTI; MARIA PAOLA; D. TONDI, 2000 PHENYLBORONIC ACID DERIVATIVE INHIBITORS OF BETA-LACTAMASES, THEIR PREPARATION, PHARMACEUTICAL COMPOSITIONS, AND THERAPEUTIC USE., Titolare: Northwestern University, N° brevetto: PIXXD2 WO 0035904 A1 20000622. **Granted**
13. SHOICHET; B.K.; TONDI; D.; M. COSTI; M.P., 1999 SULFONAMIDE BORONIC ACID INHIBITORS OF AMPC B-LACTAMASE TO REVERSE BACTERIAL RESISTANCE TO B-LACTAM ANTIBIOTICS. Titolare: Ely Lilly, Indianapolis, N° brevetto: 60/112,448-WO/2000/035904. **Granted.**

14. SHOICHET; B.K.; TONDI; D.; M. COSTI; M.P., 1999 AMIDE BORONIC ACID INHIBITORS OF AMPC B-LACTAMASE TO REVERSE BACTERIAL RESISTANCE TO B-LACTAM ANTIBIOTICS. Titolare: Ely Lilly, Indianapolis, N° brevetto: 60/112,450-WO/2000/035905. **Granted.**
15. MICHAEL KHUN; PEER BORK; M. COSTI; ROSARIA LUCIANI, 2008 APREPITANT AS ANTICANCER DRUG, Titolare: EMBL-UNIMORE, N° brevetto: 61/043,299. **Granted.**
16. COSTI MARIA PAOLA; T. ROSSI; CASOLARI CHIARA; TONDI DONATELLA; BARLOCCO DANIELA; PECORARI PIERGIORGIO; VENTURELLI ALBERTO, NAPHTHOFURANONE DERIVATIVES AS SPECIFIC INHIBITORS OF THYMIDYLATE SYNTHASES. Tydockpharma Apr, 8 2009: EP2044047. **Granted.**
17. Venturelli Alberto, Costi Maria Paola, Pecorari Piergiorgio, Rossi Tiziana, Casolari Chiara, Tondi Donatella, Barlocco Daniela: NAPHTHOFURANONE DERIVATIVES AS SPECIFIC INHIBITORS OF THYMIDYLATE SYNTHASES. Tydockpharma. Jan, 10 2008: WO 2008/003510.

PROJECTS GRANTED and Contracts, PI role (30 projects) co-PI (6 projects).

1. **1996** MURST, Progetto per giovani ricercatori. Università di Modena. "Function and inhibition of Thymidylate synthase: Synthesis of non-classical inhibitors as potential antitumor agents".
2. **1998** Contract Ely-Lilli- Northwestern University, Chicago-University of Modena, Responsabile del progetto: "Discovery of new inhibitors of beta-lactamases ". Role: Project responsible.
3. **1999 MURST** (XVIII Executive Program of the Cultural Agreement between Italy and Spain for the period 1998-2001). Role: Project responsible.
4. **1999-2001** Contract Ely-Lilli Northwestern University, Chicago-University of Modena "Novel Inhibitors of AmpC beta-Lactamase. Role: Project responsible.
5. **2000-2001** Azioni integrate Italia-Spagna (University of Modena) and Spain (Institute Lopez Neyra) "Discovery of new drugs against cellular resistance in Kinetoplastidae parasite". Role: project coordinator.
6. **2001-2005 FIRB**; progetto autonomo "Drug resistance: Design and synthesis through combinatorial strategy of inhibitors of Pteridine Reductase and Folate enzyme dependent in *Tripanosoma cruzi*", (Project number RBAU01S38Z). Role: Project coordinator.
7. **PRIN 2002 -2004**. New thymidylate synthase inhibitors: antitumoral improvement and apoptotic processes studies" (Project number 2002033121_002). Role: Local PI Unimore.
8. **2001-2005 NIH** (National Institute of health, USA) sub-contractor of Northwestern University of Chicago, Prof B. Shoichet (now UCSF, USA). 200000 USD. Role: co-PI
9. **2005-2009 NIH** (National Institute of health, USA) sub-contractor of University of California San Francisco, San Francisco, USA, (Project number NIH GM63815 grant sub-contract number 3402 sc). Role: Co-PI.
10. **PRIN 2004-2006** New thymidylate synthase inhibitors: antitumoral improvement and apoptotic processes studies", (Project number 2004030405_004). Role: Local PI Unimore.
11. **2004-2005** Finanziamento regionale Spinner per progetti di impresa Tydock. Unimore expert.
12. **2005-2006**. Finanziamento regionale Spinner per progetti di trasferimento tecnologico. Unimore expert.
13. **WHO 2005-2006**. Optimization and development of antifolates as antileishmania and antitrypanosome agents. (Project number A50599). Project developed in collaboration with WHO for biological evaluation. Role: Project coordinator.
14. **PRIN 2006-2008**. PI Unimore. New thymidylate synthase inhibitors: antitumoral improvement and apoptotic processes studies", (project number 2006030430_004).
15. **2004-2006** Internationalization grant (Interlink), MIUR, (actual period 2006- 2008). Resistenza ai farmaci: applicazione di strategie combinatoriali nella progettazione e sintesi di inibitori. Drug resistance:

application of combi-like strategies to the discovery of inhibitors of pteridine reductase in *Trypanosoma cruzi*). Human Mobility supports (Project number: II04C0CGCE).

16. **2006** Fondazione Cassa di Risparmio di Modena (Bank Foundation, <http://www.fondazione-crmo.it/>) " HTS of antiparasitic compounds" grant for Calorimeter Microcal, ITC and Multiplate reader. Role: project responsible.

17. **2006-2009** EU project "LIGHTS" on "Ligand design for interfering with human Thymidylate synthase function" progetto STREP del 6FP (6 framework program) (LSHC-CT-2006-037852) (<http://www.lights-eu.org/default.htm> (<https://cordis.europa.eu/project/id/37852/it>)).

Role: Project coordinator.

18. **2011** Cassa di Risparmio di Modena Foundation (FCRM)- Grant for congress organization on "Medicinal Chemistry in parasitology".

19. **PRIN 2009-2011**. Progettazione e sviluppo di nuovi lead diretti al pathway dei folati, attivi verso le parassitosi da *Tripanosomatidae*. Progetto n° 200925BPZ5_004. Role: Local PIP Unimore.

20. **2010-2011** INDIGO projects <http://stories.newindigo.eu/stories/tricont/> Role: Collaborator

21. **2010-2014** NIH (National Institute of health, USA) sub-contractor of University of California San Francisco, San Francisco, USA. (Project number NIH GM63815 grant sub-contract number 3402 sc).

Role: co-PI.

22. **2009-2010** Progetto di ricerca internazionale "Kinetodrugs.Disegno di inibitori del pathway dei folati per lo sviluppo di candidati farmaci antiparassitari verso Leishmaniosi e *Tripanosomiasi*." Fondazione Cassa di Risparmio di Modena (FRCMO). Role: Project coordinator.

23. **2011-2014** Project AIRC (Associazione italiana per la ricerca sul cancro) on "Targeting drug resistance in ovarian cancer". IG 10474. Role: Project coordinator.

24. **2013-2015** Coordination of the regional PhD project NOVAMOLSTAM. Discovery of small molecule tools for regenerative medicine and cancer targeting the Hippo pathway. Spinner 2013.

25. **2012-2014** Optobacteria, FP7 project, Capacity program, Research for SME, Project ID, 286998, Call, FP7-SME-2011. www.optobacteria.eu. Unimore partner entity PI. Role: Scientific Manager and PI of the Unimore partner.

26. **PRIN 2012-2015** PI Unimore. Progettazione e sviluppo di nuovi lead diretti al pathway dei folati, attivi verso le parassitosi da *Tripanosomatidae*. Role: local Coordinator

27. **2014-2017** New Medicine for *Trypanosomatidic* infections-NMTrypl- FP7-HEALTH-2013-2.2.4-2: Drug development for neglected parasitic diseases, grant agreement no 603240. <http://fp7-nmtrypi.eu>. Role: Coordinator

28. **2016-2019** Project AIRC 2015 (Associazione italiana per la ricerca sul cancro) on "Protein-protein interaction inhibitors of thymidylate synthase against colorectal cancer" IG 16977.

29. **2017-2019**. Oncologia di Precisione e Nuove Terapie Antitumorali (ONCOPENTA). Alta formazione e Ricerca. Dottorati di ricerca. Sviluppo di inibitori dell'interazione proteina-proteina contro la farmacoresistenza nei sarcomi e carcinomi. <http://formazioneelavoro.regione.emilia-romagna.it/alta-formazione-ricerca/approfondimenti/dottorati-di-ricerca/economia-digitale/oncologia-di-precisione-e-nuove-terapie-antitumorali>. (PhD student granted). Role: PhD tutor

30. **2019-2022** Collaborative activities in the project concerning Drug Resistant mechanisms in *Leishmania*. Omics approach to study the modulation of host cells after *Leishmania* infection: involvement in drug susceptibility. (LeishModCel). Ministerio de Ciencia, Innovación y Universidades. Spain. Project Ref. RTI2018-097210-B-100. Role: Local coordinator.

31. **2019-2023** Translational proteomic study, MITO group, MITO16 clinical trial. Role: local responsible of the translational proteomic project.

32. **2021-2023** European Lead Factory QHL Programme Plan (IMI Innovative Medicine Initiative) ELFSC34_10. European Lead Factory in-kind partner Target-directed screening programme. Discovery of

new dual targeting chimeric inhibitors of PTR1-DHFR from trypanosomatidic parasites. <https://www.europeanleadfactory.eu> Role: Coordinator.

33. **2021** Research partnership with (<https://www.prolynxinc.com>). Role: Research responsible.

34. **2021- 2023** Fondo di Ateneo per la Ricerca 2021 - Bando per il finanziamento di progetti di ricerca interdisciplinari Mission Oriented – Linea UNIMORE TEAD ligands prevent YAP binding and combat colorectal cancer growth and resistance. FAR2021INTERM_O_UNIM. Role: Project coordinator.

35. **2022-2027** AIRC 2021 Investigation Grant - IG 2021 ID 25785- entitled “Thymidylate synthase dimer disrupters induce DNA damage, halt cell growth, overcome drug resistance in colorectal cancer”. Role: Principal Investigator

36. **2022–2026** COST Action CA21111 entitled “*One Health drugs against parasitic vector borne diseases in Europe and beyond* (OneHealthdrugs) <https://www.cost.eu/actions/CA21111/> Role: Main proposer and COST Action chair candidate.