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CONFERENCE PROGRAM

Nanotechnology-mediated PDT	1
Massimo La Deda: <i>Plasmonics meets Nanomedicine</i>	2
Cecilia Martini: <i>Intercalation of Bioactive Molecules into Nanosized ZnAl Hydrotalcites for Combined Chemo and Photo Cancer Treatment</i>	4
Antonino Mazzaglia: <i>Nanocomplexes based on a cationic porphyrin and an anionic cyclodextrin with antimicrobial photodynamic properties</i>	5
Light-responsive materials	6
Silvia Vignolini: <i>Structural Colours and Light management in Algae</i>	7
Elisabetta Dattola: <i>Light propagation through colloid-polymer mixtures: towards uniform irradiance sources for phototherapy applications</i>	8
Eleonora Bettalico: <i>Photoluminescent iridium(III) complexes functionalised with a cationic triphenylphosphonium side chain</i>	10
Massimo Trotta: <i>Hybrid photosynthetic enzymes as versatile photoactive soft materials</i>	11
Ahmed Zubair: <i>UV-light Sensitive Visible and Near-Infra Red Emitting Lanthanide tris(β-diketonate) Complexes and their Optoelectronic Applications</i>	12
Light-induced therapies (infection & dermatology)	14
Gianfranco Canti: <i>Overview of photodynamic therapy and immune response</i>	15
Giada Magni: <i>Blue LED light effects in cultured human keloid fibroblasts</i>	16
Eleonora Martegani: <i>Photoinactivation of Pseudomonas aeruginosa biofilm by blue light</i>	18
Luca Prodi: <i>Dye Doped Silica Nanoparticles as Organized Systems for Nanomedicine</i>	19
Light-induced therapies (cancer)	20
Pål Kristian Selbo: <i>Light-controlled delivery of cancer immunotherapeutics</i>	21
Cristiano Viappiani: <i>Targeting tumor cells with photosensitizer-protein complexes</i>	22
Marzia Bruna Gariboldi: <i>Novel non-symmetrical diaryl porphyrins inhibit cellular proliferation and migration of human cancer cell lines</i>	23
Miryam Chiara Malacarne: <i>Does RNASET2 positively influence PDT-induced oxidative stress?</i>	24
Giorgia Miolo: <i>PBL (Psoralens + Blue light): blue light activates 8-MOP and TMA triggering vesical (T24) tumor cell apoptosis and death</i>	26
Light-responsive materials	27
Jifí Mosinger: <i>Photoactive nanomaterials for medical applications</i>	28

Danilo Vona: <i>Heterocomposites from diatoms microalgae</i>	29
Ilse Manet: <i>Naphthalene diimides, a versatile platform for biomedical applications</i>	31
Francesca Giuntini: <i>Silk fibroin hydrogels as potential drug delivery system in photodynamic therapy</i>	33
Poster Session	34
Gabriella Buscemi: <i>Bioconjugation strategies in garnishing the bacteria photosynthetic reaction center</i>	35
Giovanni Romano: <i>Combined PDT and doxycycline against Helicobacter pylori: indications of a synergistic and non-toxic effect</i>	37
Anna Sofia Alberton: <i>New PS derivated from 5,10,15,20-tetrapentafluorophenylporphyrin applied on photodynamic therapy</i>	39
Domenico Franco: <i>Fluorescent probes from phage display for myeloma molecular mapping</i>	40
Nicolò Fattore: <i>Light-dependent nanoparticles biosynthesis by the freshwater microalgae Chlamydomonas reinhardtii</i>	41
Michał Falkowski: <i>Synthesis and optical properties of sulfanyl porphyrazines possessing phthalimide substituents in the periphery</i>	42
Rania E. Morsi: <i>Multi-Functional Membranes for Water Treatment and Desalination with Photo-induced Antifouling Properties: Optimization of the Fabrication Conditions</i>	44
Sabari Rangasamy: <i>Mitochondria-targeted Porphyrinoids: A New class of Photosensitizer for One and Two-photon Targeted Photodynamic Therapy</i>	45
Jarosław Piskorz: <i>Boron-dipyrrromethene (BODIPY) derivatives bearing N-alkyl phthalimide and amine substituents of potential application in the photoinactivation of bacteria</i>	46
Weronika Porolnik: <i>In vitro photodynamic antimicrobial activity of novel boron-dipyrrromethene derivatives with aliphatic tertiary and quaternary amino substituents</i>	48
Light-induced therapies (infections & dermatology)	50
Piergiacomo Calzavara-Pinton: <i>Phototherapy in the Age of Biologics</i>	51
Mariachiara Arisi: <i>Non-invasive evaluation of therapeutic response of multiple actinic keratosis of face and scalp treated with field cancerization treatments</i>	52
Marina Venturini: <i>Antimicrobial photodynamic activity of RLP068/Cl in cutaneous infections: a pilot investigation</i>	53
Nanotechnology-mediated PDT	54
Francesca Moret: <i>Keratin nanoparticles co-delivering Docetaxel and Chlorin e6 promote synergic interaction between chemo- and photo-dynamic therapies</i>	55
Elisa Martella: <i>Mesenchymal stem cells as drug delivery system of dual loaded nanoparticles: a promising approach for osteosarcoma treatment</i>	57

Gary Hannon: <i>Magnetic Hyperthermia – Benefits and Drawbacks to the use of Physically-Triggered Iron Oxide Nanoparticles in the Clinic for Cancer</i>	59
Miscellaneous	60
Paola Albanese: <i>Constructing hybrid photosynthetic artificial cells transducing light energy in ATP molecules</i>	61
Annalisa Ferino: <i>Crosstalk between ROS-Kras-Nrf2 axis and NF-κB/Snail/RKIP circuitry and its implications in PDT treatment</i>	63
Laura Pedraza-González: <i>α-ARM: Automatic Rhodopsin Modeling with Chromophore Cavity Generation, Ionization State Selection, and External Counterion Placement</i>	64
María del Carmen Marín: <i>Fluorescent Enhancement of a Microbial Rhodopsin via Electronic Reprogramming</i>	65
LISTA DEI PARTECIPANTI	68

Legend:

PL: plenary; **IC:** invited communication; **OC:** oral communication; **PC:** poster communication

OC2**Nanocomplexes based on a cationic porphyrin and an anionic cyclodextrin with antimicrobial photodynamic properties**

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Nowadays, novel less-expensive nanoformulations for *in situ*-controlled and safe delivery of photosensitizer (PS) against opportunistic pathogens in body-infections areas needs to be developed. Following our ongoing research on nanophototherapeutics [1-3], here we propose the design and characterization of a novel photosensitizing nanosystem based on the marketed cyclodextrin CAPTISOL® (sulphobutylether-beta-cyclodextrin, SBE-beta-CD) to fabricate efficient biocompatible systems for antimicrobial photodynamic therapy (aPDT). Firstly, interaction studies were carried out in order to investigate the complexation between CAPTISOL® with the tetracationic water soluble meso-tetrakis(N-methylpyridinium-4-yl)porphine (TMPyP). Nanocomplexes based on CAPTISOL® and TMPyP (NanophotoCapitol) were prepared in aqueous media and characterized by complementary spectroscopy and microscopic techniques such as UV/vis, fluorescence spectroscopy, atomic force microscopy (AFM) and scanning-near field optical luminescence (SNOL), thus investigating complex stoichiometry, stability constant, photophysical and morphological properties. Furthermore size and ζ -potential were measured by Dynamic light scattering and Electrophoretic Light Scattering, respectively. Release and stability studies were performed in physiological conditions pointed out the role of CAPTISOL® to sustain the PS release. Finally, photoantimicrobial activity of the NanophotoCapitol vs free porphyrin were investigated against Gram-negative *Pseudomonas aeruginosa* ATCC 27853, by showing as the proposed nanosystems can control along the time the release of porphyrin to photokill Gram-negative bacterial cells.

[1] Castriciano, M.A., Zagami, R., Casaletto M. P., Martel. B., Trapani, M., Romeo, A., Villari, V., Sciortino, M. T., Grasso, L., Guglielmino, S., Monsù Scolaro, L., Mazzaglia A. (2017) *Bioamromolecules*, 18, 1134.

[2] Scala, A., Piperno, A., Grassi, G., Monsù Scolaro, L, Mazzaglia, A. (2017) in *Nanoconstructs Based on Cyclodextrins for Antimicrobial Applications*. In Nano- and Microscale Drug Delivery Systems, Grumezescu, A. M., Ed. Elsevier: pp 229-244.

[3] Zagami,R., Sortino, G., Caruso, E., Malacarne, M., Banfi, S., Patanè,S., Monsù Scolaro,L. Mazzaglia, A. (2018) *Langmuir*, 34, 8639.

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