

III Congrés AMIT–Cat

Dones en Nanociència i Nanotecnologia

Dimecres, 8 de febrer de 2023

Institut d'Estudis Catalans (IEC), Barcelona

Organitza:



Patrocinen:



Institut
d'Estudis
Catalans



Institut de Nanociència
i Nanotecnologia
UNIVERSITAT DE BARCELONA

Comitè organitzador:

Azucena Bardají (ISGlobal)

Francesca Campabadal (Institut de Microelectrònica de Barcelona, IMB-CNM, CSIC)

Sònia Estradé (Institut de Nanociència i Nanotecnologia, Universitat de Barcelona, IN2UB)

Arantxa Fraile Rodríguez (Institut de Nanociència i Nanotecnologia, Universitat de Barcelona, IN2UB)

Arantzazu González (Institut de Ciència de Materials de Barcelona, ICMAB-CSIC)

Marta González Silveira (Universitat Autònoma de Barcelona, UAB, i Institut Català de Nanociència i Nanotecnologia, ICN2)

Anna Laromaine (Institut de Ciència de Materials de Barcelona, ICMAB-CSIC)

Anna Mujal (Universitat Politècnica de Catalunya, UPC)

Neus Vidal (Universitat de Barcelona, UB)

PROGRAMA

BENVINGUDA (9:15 -9:30):

Arantxa Fraile Rodríguez i Sònia Estradé (AMIT-Cat) i Alícia Casals (IEC)

SESSIÓ 1 (9:30 – 11:45)

Chairs: Anna Laromaine (ICMAB-CSIC) i Azucena Bardají (ISGlobal)

- **Nora Ventosa** (*Invitada*), Desenvolupament de nanomedicines: recerca bàsica i col·laboració amb l'empresa, Institut de Ciència de Materials de Barcelona, ICMAB-CSIC. Bellaterra.
- Ariadna Boloix, Quatsomes are a novel platform to deliver RNA-based therapies for càncer, Vall d'Hebron Research Institute (VHIR), Barcelona.
- Amanda Muñoz-Juan, C. elegans model, a valuable step in the bio-evaluation of nanomaterials, Institut de Ciència de Materials de Barcelona, ICMAB-CSIC. Bellaterra.
- Coral García Fernández, Stealth polyplexes to control the biological fate of nanomedicines, Institut Químic de Sarrià, Universitat Ramón Llull, Barcelona.
- Anna Lagunas, Deciphering membrane protein function at the nanoscale, Institute for Bioengineering of Catalonia (IBEC), Barcelona.
- **Mónica García-Mota** (*Invitada*), Atomistic Simulation Advanced Platform (ASAP) for materials modelling with ab initio methods, SIMUNE Atomistics, Donostia.
- Negar Ahmadi, Transdermal permeation of an arylalkanoic acid non-steroidal anti-inflammatory drug carried in a pluronic® F127 hydrogel loaded with lipid nanocarriers for the treatment of local inflammation, Facultat de Farmàcia i Ciències de l'Alimentació, Universitat de Barcelona, Barcelona.
- Ramona Santini, Drug loading strategies for discotic amphiphile supramolecular polymers in water, Institute for Bioengineering of Catalonia (IBEC), Barcelona.
- Galyna Maleeva, Donor-acceptor Stenhouse adduct-based photooswitch for GABA receptors, Institute for Bioengineering of Catalonia (IBEC), Barcelona.
- Paola Bustos-Salgado, Skin permeation study of derivative flavanone carried in a PLGA Nanoparticle System, Facultat de Farmàcia i Ciències de l'Alimentació, Universitat de Barcelona, Barcelona.
- Negar Beirampour, Baricitinib in Poly(epsilon-caprolactone) nanoparticles for ocular drug delivery, Facultat de Farmàcia i Ciències de l'Alimentació, Universitat de Barcelona, Barcelona.

PAUSA CAFÈ (11:45-12:15)

SESSIÓ 2 (12:15 – 13:45)

Chairs: Marta González (UAB i ICN2) i Arantxa Fraile Rodríguez (IN2UB)

- **Marta Estrader** (*Invitada*), Unveiling new insights into bi-magnetic antiferromagnetic/ferrimagnetic Core/Shell nanoparticles: a multicharacterization approach, Dept. Química Inorgànica i Orgànica, Universitat de Barcelona, Barcelona
- Karen Mejía-Carmona, Cerium - doped Magnetite Nanoparticles: Synthesis and Characterization, Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC and BIST, Bellaterra.
- Marta Xiulan-Aribó, Probing single antiferromagnetic NiO nanoparticles by synchrotron-based X-ray spectromicroscopy, Departament Física de la Matèria Condensada, Universitat de Barcelona, Barcelona.
- Ana M. López-Periago, Nanoporous composites prepared using supercritical fluids, Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Bellaterra.
- Marta Rodríguez-López, Electric fields for tuning molecular orientation in TPD-modified glasses: experiments and simulations, Group of Thermal properties of Nanoscale Materials, Universitat Autònoma de Barcelona, Bellaterra.
- Marta Ruiz-Ruiz, Glass transition in ultrastable glasses: a close look by means of AFM, Depto. Física, Universitat Autònoma de Barcelona, Bellaterra.
- Rosario Núñez, Exploring Icosahedral Boron Clusters in Nanomaterials, Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Bellaterra.
- Núria Aliaga-Alcalde, Use of curcuminoids in molecular electronics and as sensors, ICREA i Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Bellaterra.

PAUSA DINAR (13:45 – 15:30)

SESSIÓ 3 (15:30 – 17:40)

Chairs: Francesca Campabadal (IMB-CNM, CSIC) i Arancha González (ICMAB, CSIC)

- **Adriana I. Figueroa** (*Invitada*), Spintronics in novel quantum materials: interfacial phenomena, Dept. Física de la Matèria Condensada, Universitat de Barcelona, Barcelona.
- Regina Galceran, 2-dimensional materials at the interfaces of spintronic devices, Dept. Física Aplicada, Universitat de Barcelona, Barcelona.
- Elif Oceri, Advanced Processing of Epitaxial Graphene grown on SiC for the Fabrication of Top-Gated Graphene FETs, Institut de Microelectrònica de Barcelona (IMB-CNM, CSIC), Bellaterra.
- Susagna Ricart, Tunable BaMO₃ (M= Ti, Zr and Hf) Nps used on CSD approach to YBa₂Cu₃O_{7-δ} superconducting layers, Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Bellaterra.
- Beatriz Vargas, TEM analysis for Thin-Film Ferroelectric Orthorhombic α -Pr₂WO₆ Polymorph, Dept. Electronics and Biomedical Engineering, Universitat de Barcelona, Barcelona.

- Mercedes Saludes-Tapia, Caracterización, modelización y simulación de memristores basados en estructuras MIM, Institut de Microelectrònica de Barcelona (IMB-CNM, CSIC), Bellaterra.
- Annalisa Calò, Spatial mapping of cells and tissues properties at small scales by AFM, Facultat de Física, Universitat de Barcelona, Barcelona.
- Sílvia Pujals, Super resolution microscopy applied to nanomedicine, Institute for Advanced Chemistry of Catalonia (IQAC), CSIC, Barcelona.
- Maria Guix, 3D printing technologies for the development of living robòtics, Dept. Ciència dels Materials i Química Física, Institut de Química Teòrica i Computacional, Universitat de Barcelona, Barcelona.
- **Sílvia Simón** (*Invitada*), Institut de Química Computacional i Catàlisi, Universitat de Girona, Girona.
- Ana B. Caballero, La vuelta al cole de una nanoexperta, Dept. Química Inorgànica I Orgànica, Facultat de Química, Universitat de Barcelona, Barcelona.

PAUSA CAFÈ (17:40 – 18:10)

TAULA RODONA (18:10)

Divulgació i comunicació de la nanociència.

Participants: Sílvia Simón, Montse García del Muro, Carmen Ocal i Susagna Ricart.

Modera: Ana B. Caballero.

DRUG LOADING STRATEGIES FOR DISCOTIC AMPHIPHILE SUPRAMOLECULAR POLYMERS IN WATER

Ramona Santini^{a,b}, Edgar Fuentes^a, Galyna Malieieva^a, Carlo Matera^{a,c,d}, Fabio Riefolo^a, Lorenzo Albertazzia^{a,e}, Pau Gorostiza^{a,d,f}, Silvia Pujals^{a,g}.

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BTA-based supramolecular polymers are interesting systems for medical applications because of their high dynamicity and stimuli responsiveness in water¹. Recently, IBEC developed a new class of BTA-based supramolecular polymers which showed responsiveness to temperature, salt concentration, pH, and light². This versatility makes this new class of self-assembled fibers appealing for drug delivery purposes. In this work, we explored two strategies to incorporate different biologically active ligands into these polymers and demonstrate their employability as **light-driven drug delivery systems**. In the first strategy, we used a **co-assembly** approach in which two new discotic BTA-azo-monomers assemble forming the final helicoidal supramolecular fibers. In the second one, we decided to cage Photoiperoxo³, a potent photoswitchable derivative of the mAChR agonist Iperoxo³. Here, the interaction is based on the **stacking** between the azobenzene units of the ligand and the monomers. From the first approach, we obtained satisfying co-assembly results which were evaluated by transmission electron microscopy. Remarkably, the second system showed light-dependent biological effects in calcium imaging experiments on cells overexpressing M1 mAChRs. While caged Photoiperoxo did not evoke significant changes, UV pre-illuminated fibers caused an increase in intracellular calcium levels because of the activation of M1 mAChRs by the uncaged ligand. These results suggest that the new class of BTA-based supramolecular polymers² can potentially be used as light-driven drug delivery system for small, planar and amphiphilic drugs.

References

- [1] Kantekin, S.; de Greef, T.F.A.; Palmans, A.R.A. *Chemical Society Reviews*. **41**, 6125-6137, (2012).
- [2] Fuentes E.; Gerth M.; Berrocal J.A.; Matera C.; Gorostiza P.; Voets I.K.; Pujals S.; Albertazzi L. *J Am Chem Soc.*, **142**, 10069-10078, (2020).
- [3] Agnetta, L.; Bermudez, M.; Riefolo, F.; Matera, C.; Claro, E.; Messerer, R.; Littmann, T.; Wolber, G.; Holzgrabe, U.; Decker, M. *Journal of Medicinal Chemistry*., **62**, 3009-3020, (2019).