



PROJECT ACRONYM

CUPIDO

PROJECT TITLE

Cardio Ultraefficient nanoParticles for Inhalation of Drug prOducts

Deliverable 10.5

e-Newsletter

CALL ID	H2020-NMBP-2016-2017		
GA No.	720834		
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NATURE	Report (R)	DISSEMINATION LEVEL	PU
DUE DATE	31/01/2018	ACTUAL DELIVERY DATE	19/06/2018
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Table of Revisions



REVISION NO.	DATE	WORK PERFORMED	CONTRIBUTOR(S)
1	04/06/2018	Document production	Michela Candotti
2	18/06/2018	Revision and approval	IPR Team



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1. Executive summary

The CUPIDO newsletter will be issued periodically starting from June 2018. Each newsletter has a defined structure and layout that include a project presentation, few updates on the latest results and some highlights regarding events or publications of the consortium. The newsletter is mainly build by news from the blog-like feature of the website and it will help to direct the audience to the main website, where most of the information about Cupido is available. The first issue was released in June 2018 and it's available at this [link](#).

Key deliverable achievements:

1. Development of the newsletter layout
2. Production of the first 3 news with updates on the project results
3. Production of the 1st CUPIDO newsletter

2. Cooperation between participants

IN developed the layout and the content of the newsletter which was revised and approved by the project coordinator, the Communication Core Group. The content of the first newsletter was extracted from documents that were already approved by the IP committee and produced by the partners. All the consortium was invited to distribute and promote the newsletter among their contacts.

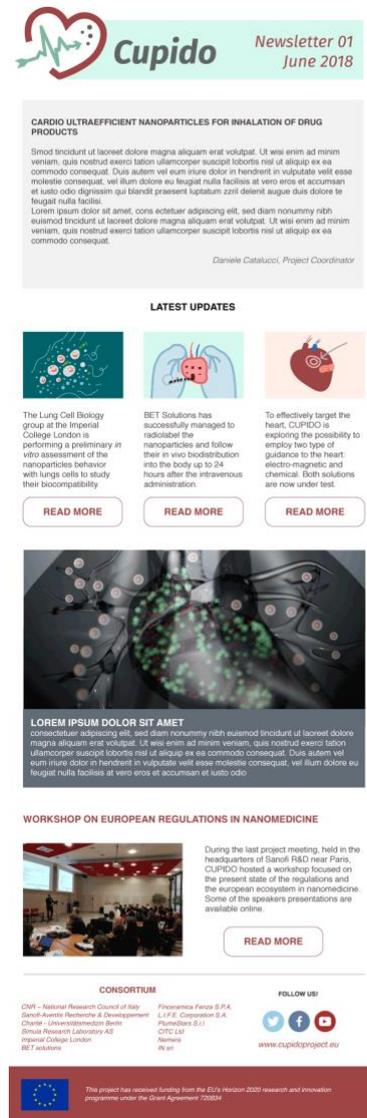


3. Core report

3.1. Newsletter layout

The CUPIDO newsletter will be issued periodically starting from June 2018. Each newsletter has a defined structure, comprising the following parts (see Figure 1):

1. Project **presentation**
2. An overview of the project **updates** organized in 3 news. The news is presented with a brief exert and it redirect to the full news stored in the website.
3. One or two **highlights** from past or future dissemination activities (publications or events)
4. Project partners and useful links
5. Acknowledgments



Project Presentation - FIX

3 news with updates

Highlights from past or future dissemination activities

Partners, useful links, acknowledgements - FIX

Figure 1 Newsletter layout



Each issue will provide an overview on the current status of the project. The section “Latest updates” will provide a general description of what has been achieved so far, while the section on the dissemination activities will be used whenever possible to promote future events organized by the project or to share relevant content i.e. past publications or content from the past events.

3.2. News and updates

For the 1st issue on June 2018, 3 pieces of news have been selected to provide an up to date overview of the project. The updates come from 3 different aspects of the nanoparticles journey: their biocompatibility with the lung cells, their biodistribution into the body and the chemical guidance to the heart. Updates were also available about the electromagnetic guidance but they will be included in the following issues.

Here we report the full text for each of the news part of the 1st newsletter, which are also available on the project website under “News” section.

3.2.1. *In vitro* biocompatibility with the lung

The Lung Cell Biology group at the Imperial College London is performing a preliminary *in vitro* assessment of the nanoparticles behavior with the lungs cells, the first target that the nanoparticles encounter before translocating to the heart.

In order to study the biocompatibility, a broad range of concentrations of nanoparticles have been applied to alveolar type 1 cells and analyzed after 24 hours, looking in particular for cell survival rates and sign of inflammation. Overall, these preliminary studies indicate that the nanoparticles did not induce cell death when applied to the alveolar epithelial type 1-like model. Further studies are required to quantify particle uptake and to complete the bio reactivity studies in more physiological-like conditions that take into account the air exposure and blood flow dynamics. For this reason, the CUPIDO consortium is currently developing a fluid-flow bioreactor that mimics the gas-blood interface found in the lung.

3.2.2. The nanoparticle biodistribution

During the last year, BET Solutions has managed to radiolabel the nanoparticles in order to follow their distribution in the body after administration. So far, the intravenous administration route was used as reference since it represents the most commonly-used path to deliver pharmaceuticals into the body.

The *in vivo* fate of the NPs was assessed through planar Single Photon Emission Tomography (SPECT) imaging, in combination with x-ray imaging. While the SPECT imaging provides a semi-quantitative picture of the accumulation of the nanoparticles in the organs throughout time, the x-ray imaging instead provides an anatomical image at very high resolution, that can act as an anatomical map. The combination of the two methods provides a detailed and clear biodistribution of the tracked nanoparticles up to 24 hours.

In the future, this procedure will be also applied to test the nanoparticles bio distribution after inhalation, the administration route preferred by CUPIDO.

3.2.3. Guidance to the heart

CUPIDO aims to improve the specificity to the heart by using a chemical-based targeting system. To achieve this aim, on the surface of the nanoparticles have been included aptamers that should enhance the internalization into myocardial cells. Aptamers, which are short single stranded oligonucleotides of modified DNA or RNA, are emerging as very interesting molecules that can fold into complex tertiary structures and bind with high affinity to a cell-selective target. If the target is undergoing receptor-mediated cell internalization, it can serve as a carrier for intracellular delivery too.

In CUPIDO the CNR-IRGB identified promising aptamers that target the myocardium and promote the internalization and passed them to the team at the CNR-ISTEC, which took to functionalized and characterized



the nanoparticles with the provided aptamers. Once the nanoparticle-aptamer systems were ready, the CNR-IRGB tested their behavior *in vitro* and confirmed that they can be internalized inside the cardiac cells.

3.3. The 1st newsletter

In June 2018, the first issue of the CUPIDO newsletter came out. Besides the updates on the status of the project presented in the section above, the newsletter also included two highlights that were already published on the website and regarding:

1. The publication on the Science Translational Medicine [LINK](#)
2. The last workshop on European Regulation in Nanomedicine [LINK](#)

The final newsletter can be found here: <https://mailchi.mp/862667e9408a/newsletter-1>

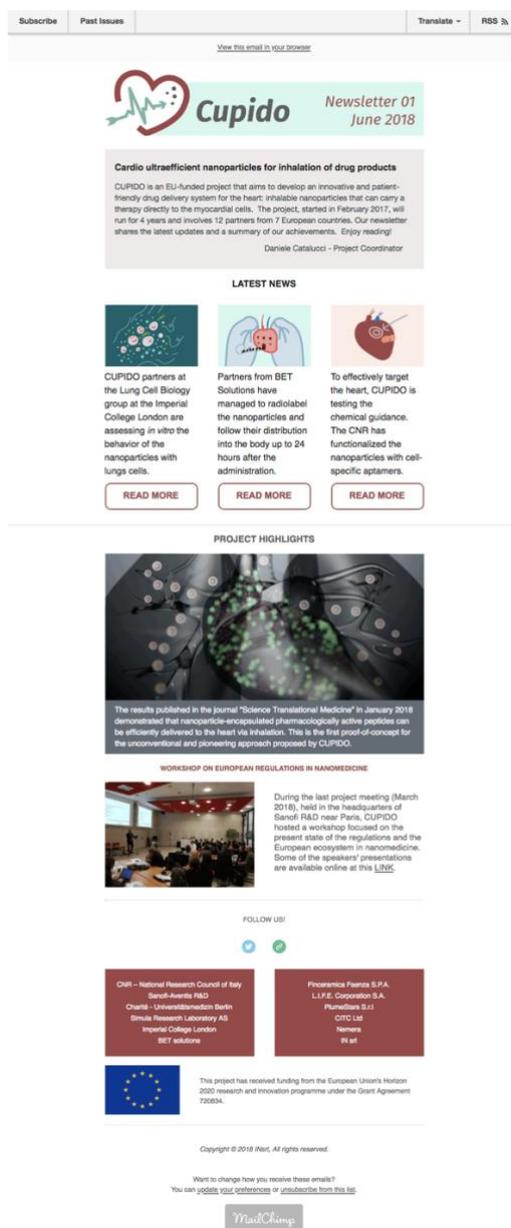


Figure 2 The final version of the 1st newsletter

4. Conclusions



A newsletter to inform about the major highlights from the project will be issued periodically. The layout, general structure and the complete first issue of the CUPIDO newsletter are ready. The 1st newsletter has covered several topics related to the nanoparticles: their biocompatibility with the lungs cells, the method to track their bio distribution and the chemical guidance to the heart. Next issues will feature updates, available for public release, and highlights from events or papers from the Consortium.