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Editorial: Microemulsions and Nanostructures for Efficient Tumor-Targeted Drug Delivery

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Editorial on the Research Topic

Microemulsions and Nanostructures for Efficient Tumor-Targeted Drug Delivery

Cancerous tumour treatment is a challenge faced by clinicians worldwide, even with the more recent advances in drug delivery techniques. These facts have gained particular importance since 2019 with the outbreak of the coronavirus disease that rapidly developed into a pandemic (Al-Quteimat and Amer, 2020; Jindal et al., 2020; Saini et al., 2020). According to the World Health Organization, as of 03 February 2022, there have been 383,509,779 confirmed cases of COVID-19, including 5,693,824 deaths worldwide (World Health Organization, 2022). Cancer patients are most susceptible to becoming infected with COVID-19 because they are often severely immunocompromised by their disease or therapy (Al-Quteimat and Amer, 2020; Jindal et al., 2020; Saini et al., 2020).

An important step forward initiative to collect data (fundamental for future research works) is, for instance, the effort of the COVID-19 and Cancer Consortium (CCC19) database (Kuderer et al., 2020). There is no doubt that this type of initiatives and others inspired in nanosystems will be of great help to tackle problems related to therapies in COVID-19 patients with cancer comorbidity, including new variants of the SARS-CoV-2 strain that started the pandemic (Gage et al.; Peter et al.). Based on these considerations the future role of microemulsions (thermodynamically stable systems) and nanostructures for efficient tumour-targeted delivery of anticancer drugs to patients with COVID-19 and other comorbidities looks promising.

It seems evident from the previous evidence that the issue of efficient tumour-targeted drug delivery has become more relevant since it could avoid systemic exposure to the therapeutic drugs used in the treatments. Microemulsions and nanostructures are particularly suitable systems to achieve the goal of drug delivery. They are efficient for tumour treatment, diminishing unwanted side effects and decreasing dose administration, providing, hopefully, patient-friendly chemotherapies.

The goal of this Research Topic was to report advances in microemulsions and nanostructures for targeted drug delivery applications, including aspects associated with the intriguing fundamental problems in the synthesis and applications of these most exciting nanodevices.

The published papers in this Research Topic include three minireviews and one research article. The review by López Mendoza and Alcántara Quintana, reports summarized advances in developing nanodevices and smart nanocarriers with single or dual function for cancerous tumour treatment and the toxicity and delivery of these devices in *in vivo* models. Further, an overview of different administration routes for drug delivery is also presented. The review by Suhail et al., emphasizes the properties and recent developments of microemulsions with therapeutical medical applications.

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Arredondo-Ochoa and Silva-Martínez review and describe different microemulsion-derived biocompatible nanostructures for controlled drug delivery aimed to frontier therapeutic applications.

The research by Kaushal et al. reports the evaluation of double-coated poly (butyl cyanoacrylate) nanoparticles with Tween 80 and polyethylene glycol 20,000 shells as carriers systems loaded with doxorubicin able to overcome P-glycoprotein and breast cancer resistant protein–mediated multidrug resistance in cancer cell lines.

Even though the reviews and research published in this Research Topic report additional convincing evidence of the advantages of using microemulsions and nanostructures to deliver drugs efficiently, the fact that further research and development is needed to achieve practical applications in medicine is recognized. We sincerely hope that the reports gathered in this Research Topic, will inspire future experimental explorations in these fascinating topics.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

REFERENCES

Al-Quteimat, O. M., and Amer, A. M. (2020). The Impact of the COVID-19 Pandemic on Cancer Patients. *Am. J. Clin. Oncol.* 43 (6), 452–455. doi:10.1097/COC.0000000000000712

Jindal, V., Sahu, K. K., Gaikazian, S., Siddiqui, A. D., and Jaiyesimi, I. (2020). Cancer Treatment during COVID-19 Pandemic. *Med. Oncol.* 37, 58. doi:10.1007/s12032-020-01382-w

Kuderer, N. M., Choueiri, T. K., Shah, D. P., Shyr, Y., Rubinstein, S. M., Rivera, D. R., et al. (2020). Clinical Impact of COVID-19 on Patients with Cancer (CCC19): a Cohort Study. *Lancet* 395, 1907–1918. doi:10.1016/S0140-6736(20)31187-9

Saini, K. S., de Las Heras, B., de Castro, J., Venkitaraman, R., Poelman, M., Srinivasan, G., et al. (2020). Effect of the COVID-19 Pandemic on Cancer Treatment and Research. *Lancet Haematol.* 7 (6), E432–E435. doi:10.1016/S2352-3026(20)30123-X

World Health Organization (WHO) (2022). Available at: https://covid19.who.int/ (consulted February 03, 2022).

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