

Review of the Doctoral Thesis

Title of the Doctoral Thesis: **Drug Self-Delivery Systems for Enhanced Targeted Cancer Therapy**

Submitted by: **M.S. Haijun Xiao**

Doctoral study program: **Materials Science and Engineering**

Doctoral study course: **Biomaterials and Biocomposites**

Supervisor: **prof. Ing. Vladimír Sedlařík, Ph.D.**

The doctoral thesis submitted by Haijun Xiao is composed of 184 pages where pages 9-71 include the theoretical introduction to the topic of doctoral thesis. This chapter is written readably and provides comprehensive insight into methods used for cancer treatment, materials used for preparation of drug delivery systems, and types of drug delivery systems. I especially appreciate the comprehensive view into the topic, e.g. that student described not only drug delivery-based treatment of cancer but even all other relevant methods. On the other hand, some parts are beyond the specialisation of students and used interpretation are not often absolutely correct. Most important however is, that in the parts relevant to the topic student has demonstrated adequate knowledge. In the introduction I miss only the deeper view into the biology of cancer cells and especially of solid tumours, but I understand that this issue is very complicated and out of student specialization.

After the introduction student clearly define the main aims of his doctoral thesis, concretely to develop self-delivered platform for combinational delivery of irinotecan hydrochloride and curcumin without utilising carriers, and comprehensively characterise this in terms of both material and biological properties. The aim, as defined by students, is very difficult to fulfil due to multidisciplinary.

Material and Methods, as well the Results and discussion are chapters supported by information's presented in already published manuscripts. Together provide extensive view into the methodology the student used within the work on his Ph.D. thesis. It is clear, that students have to at least understand a principle of a number of characterization methods and their interpretations. As mentioned, the results of student's work have been already published in two papers. I appreciate not only the quality of one journal where he successfully published his work (Biomaterials) but also the fact that he is a first author of both already published manuscripts. One other manuscript is expect to be submitted soon.

I was a bit disappointed that in thesis the “Contribution to the science” chapter is not presented. It is a pity because student has enough scientific results which could be nicely put into the context of results of other scientific groups.

Although I identified few weak points of doctoral thesis in previous text, it is important to notice that the thesis fulfil the criteria for the doctoral thesis. I must also emphasize that Haijun Xiao gathered impressive amount of results which were already published in 2 manuscripts published in reputable scientific journals. One another manuscripts are according to the “List of papers” ready to be submitted.

It should be also mentioned, that the text is equipped with author’s “CV”; “List of publications” as well as with necessary formal items like “Lists of tables, figures and abbreviation”. It should be also stated that there can be found some imperfections in the text but in an amount common for the doctoral thesis. The description of relevant topics is complete and understandable and the ideas are easy to follow in the text.

Questions:

- The complexity of study in terms of used techniques (material preparation, characterization, *in vitro* and *in vivo* evaluation of biological properties) is enormous. Student should clearly present which experiment was done and interpreted by himself.
- It is well known fact, that cancer cell population is very variable. In fact in any cancer are a different cells populations sensitives to different treatments. Can you, based on your results, define what should be the most effective combination of your system with other used for cancer treatment?

The submitted doctoral thesis fulfils all requirements given by Tradition, Law and by The Study and Examination Rules of Tomas Bata University in Zlín as Ph.D. qualifying paper **and therefore I recommend approval of the paper for further needful assessment.**

In Zlín, 5th November 2020

doc. Ing. Petr Humpolíček, Ph.D.