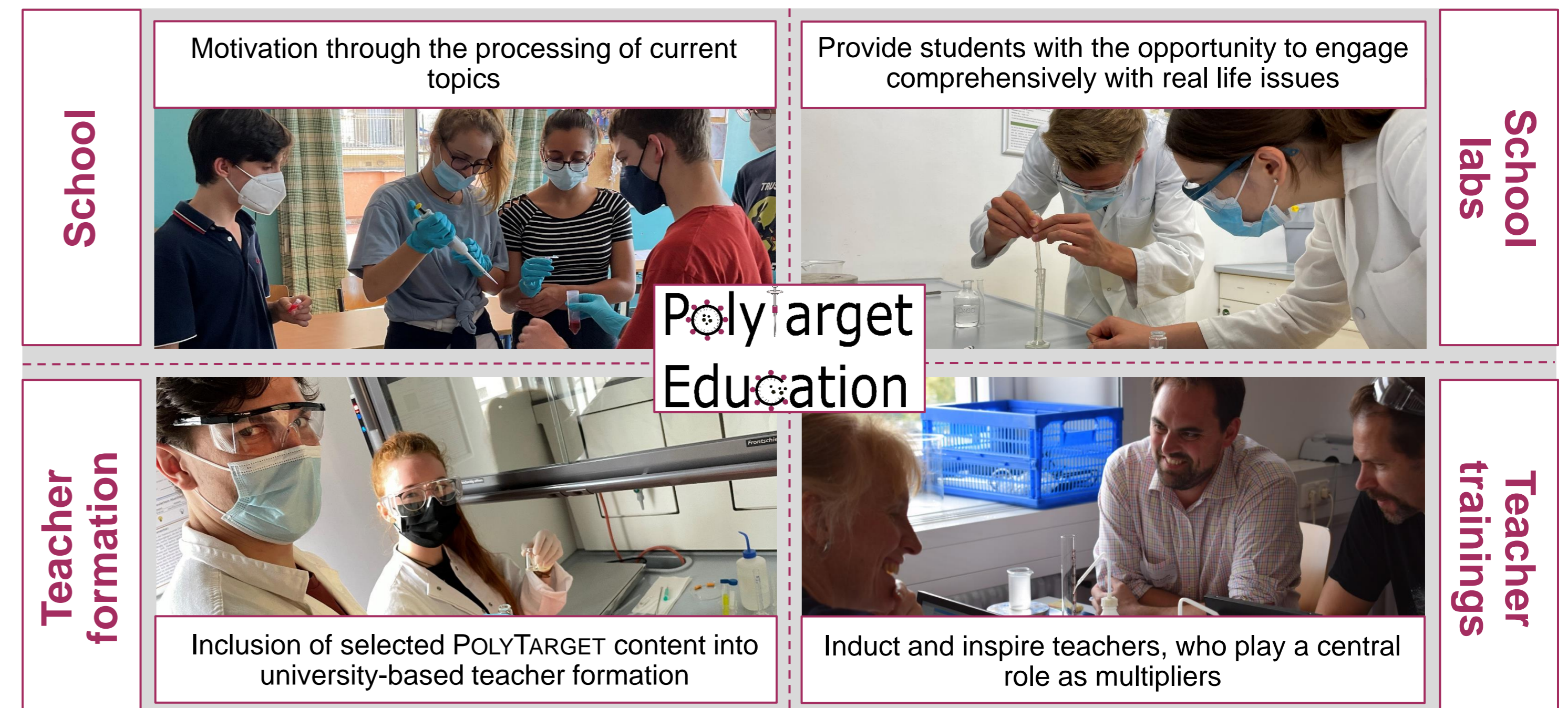


Nanomedicine in chemistry education – Synthesis of smart nanocarriers and targeted drug delivery

Summary

Through the public project Ö01, **central findings of POLYTARGET are made accessible for chemistry education**. In addition to the content discussion, model experiments can be used to introduce scientific working methods and procedures, such as analysis and measurement methods. The target groups carry them out by themselves in order to (1) gain a deeper understanding and (2) acquire new and improve existing experimental skills. By means of didactic reconstruction, a connection between science and society is going to be established. **The target groups are students from grades 10 to 13, student teachers and teachers** who are integrated into the project results via existing networks and can subsequently act as multipliers.



Results

Student experiments

Various practical experiments have already been developed and supplemented with theoretical materials. Some have already been piloted.

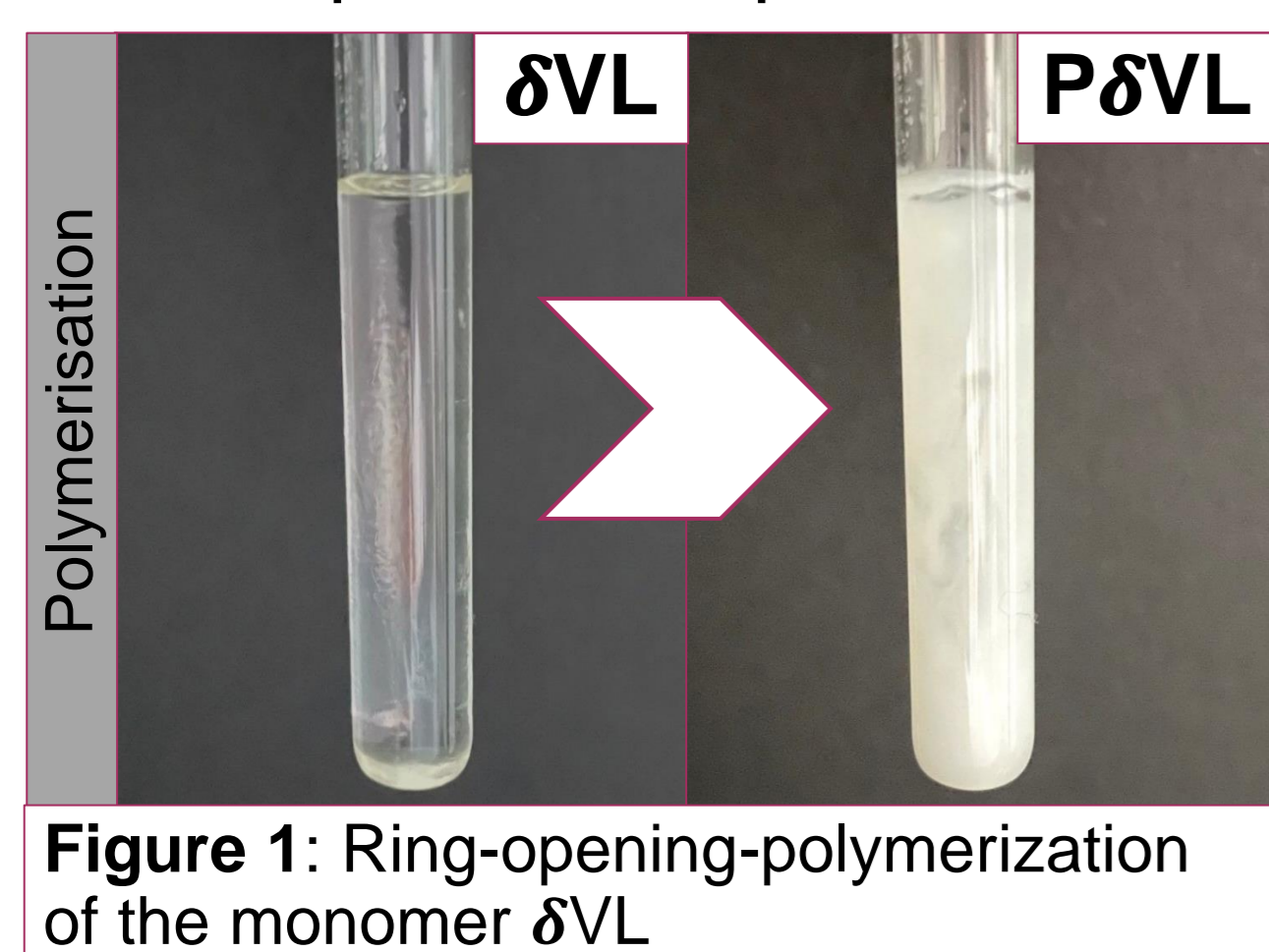


Figure 1: Ring-opening-polymerization of the monomer δ VL

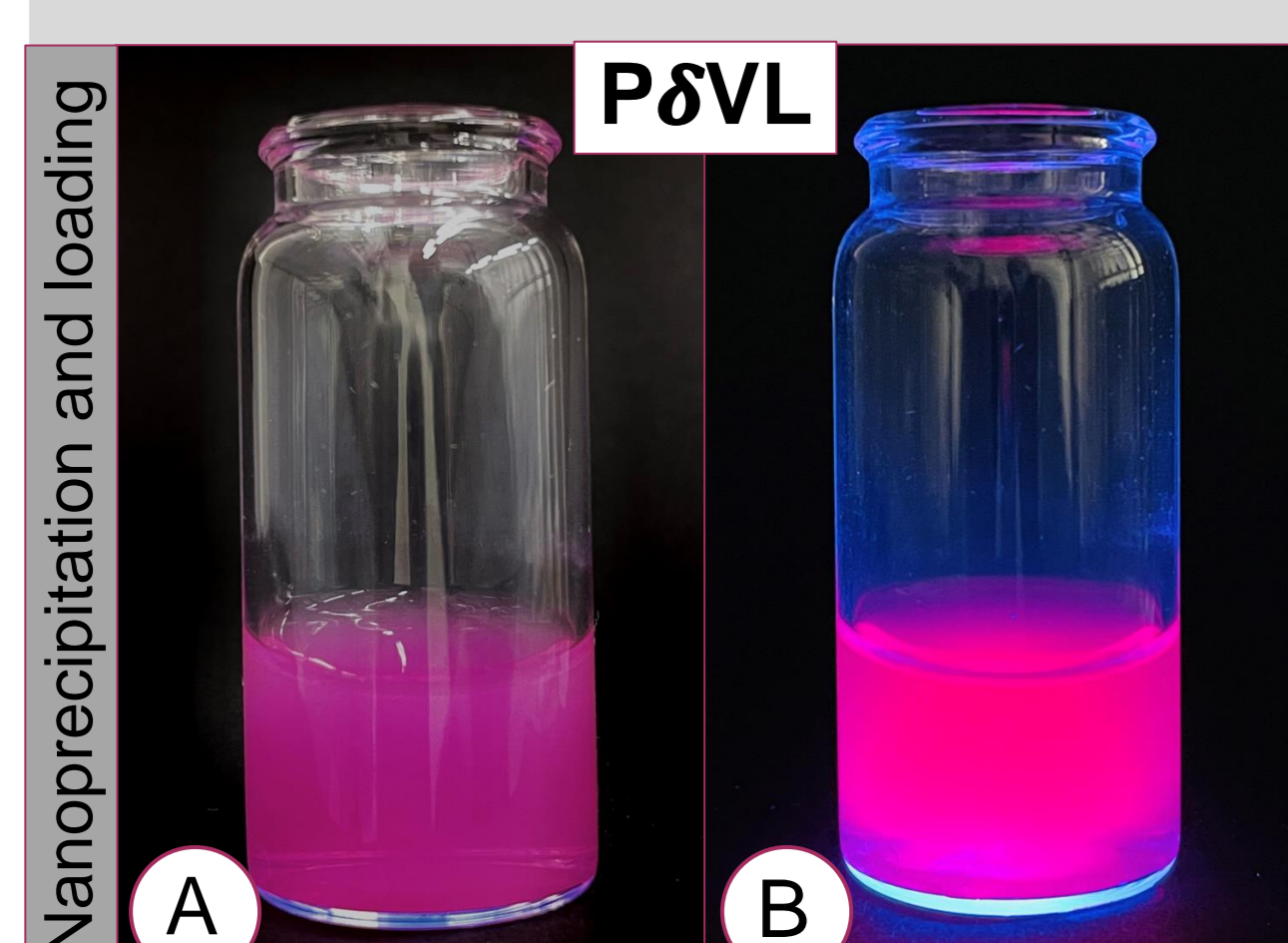


Figure 2: Nanoparticles loaded with Nile red: without UV light (A), with UV light (B)

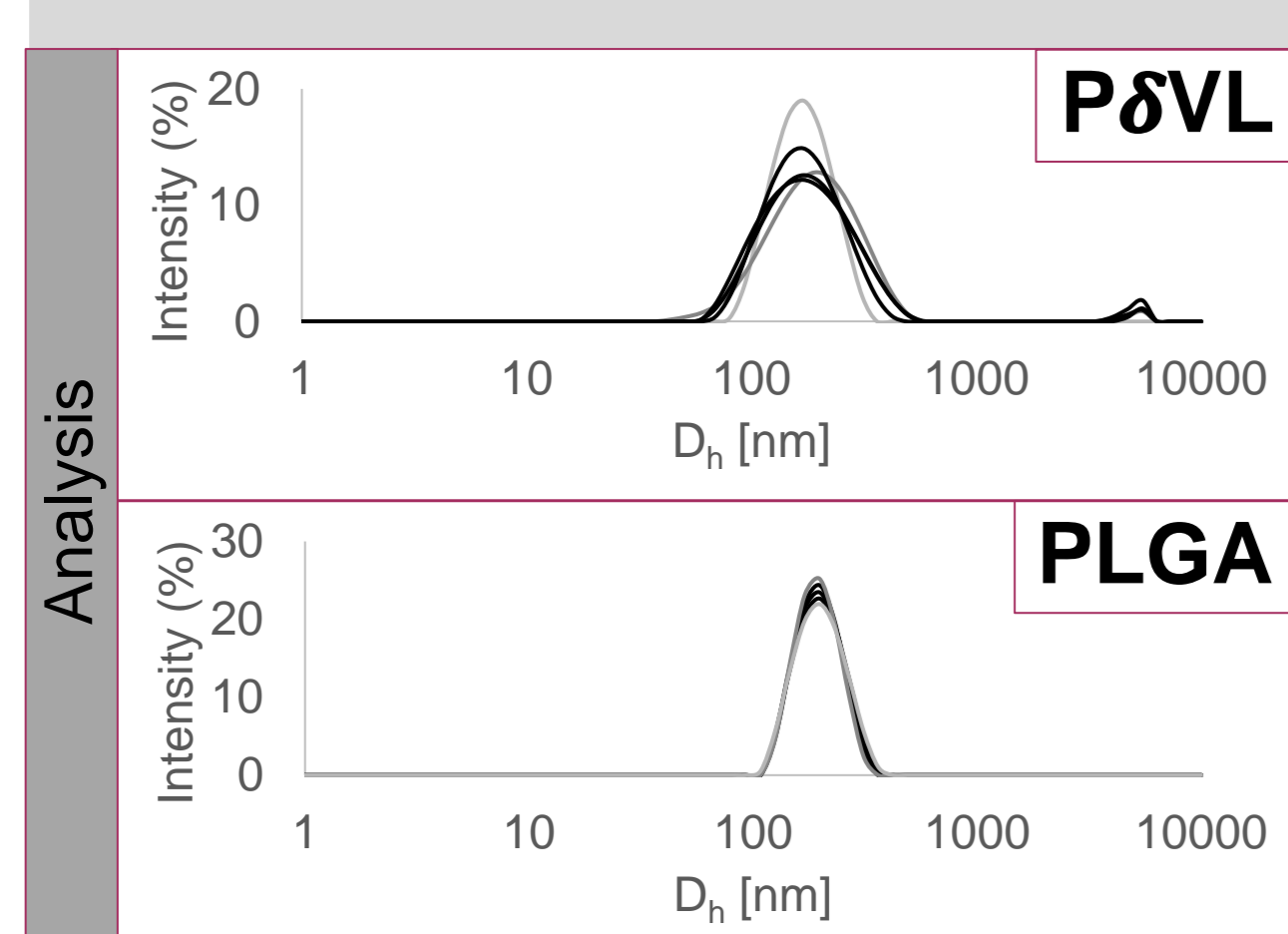


Figure 3: Intensity-based particle size distributions analysed via DLS

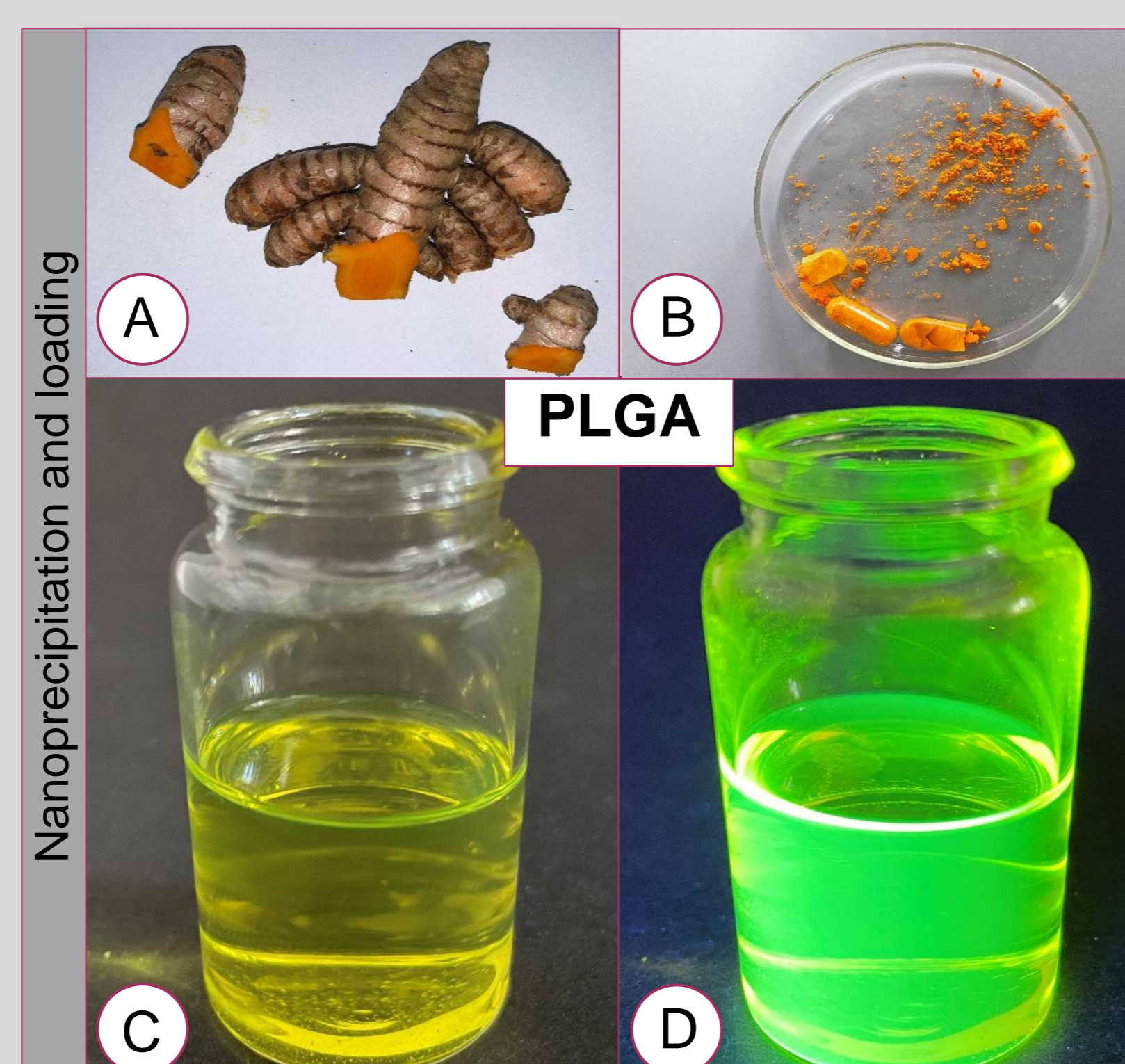
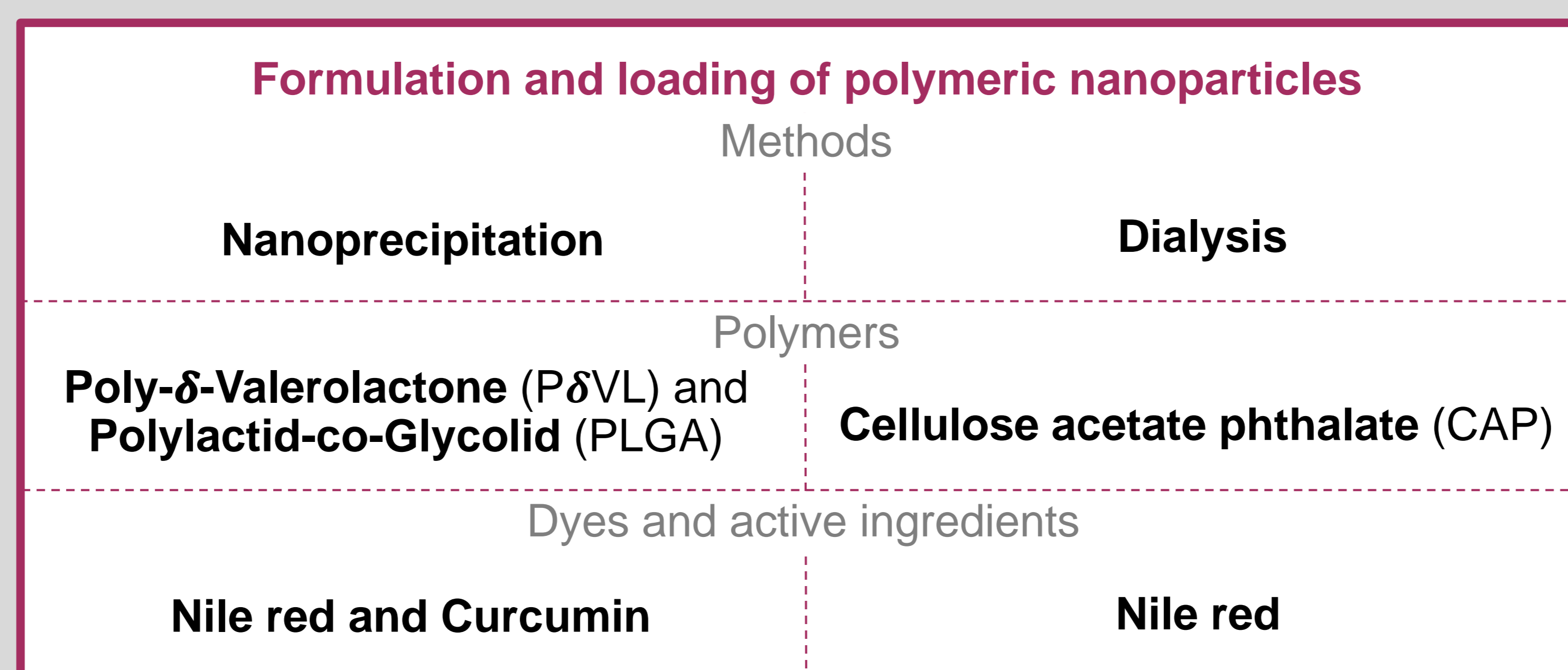


Figure 4: Top - turmeric (A), opened curcumin-tablets for the experiment (B), down - nanoparticles loaded with curcumin: without UV light (C), with UV light (D)

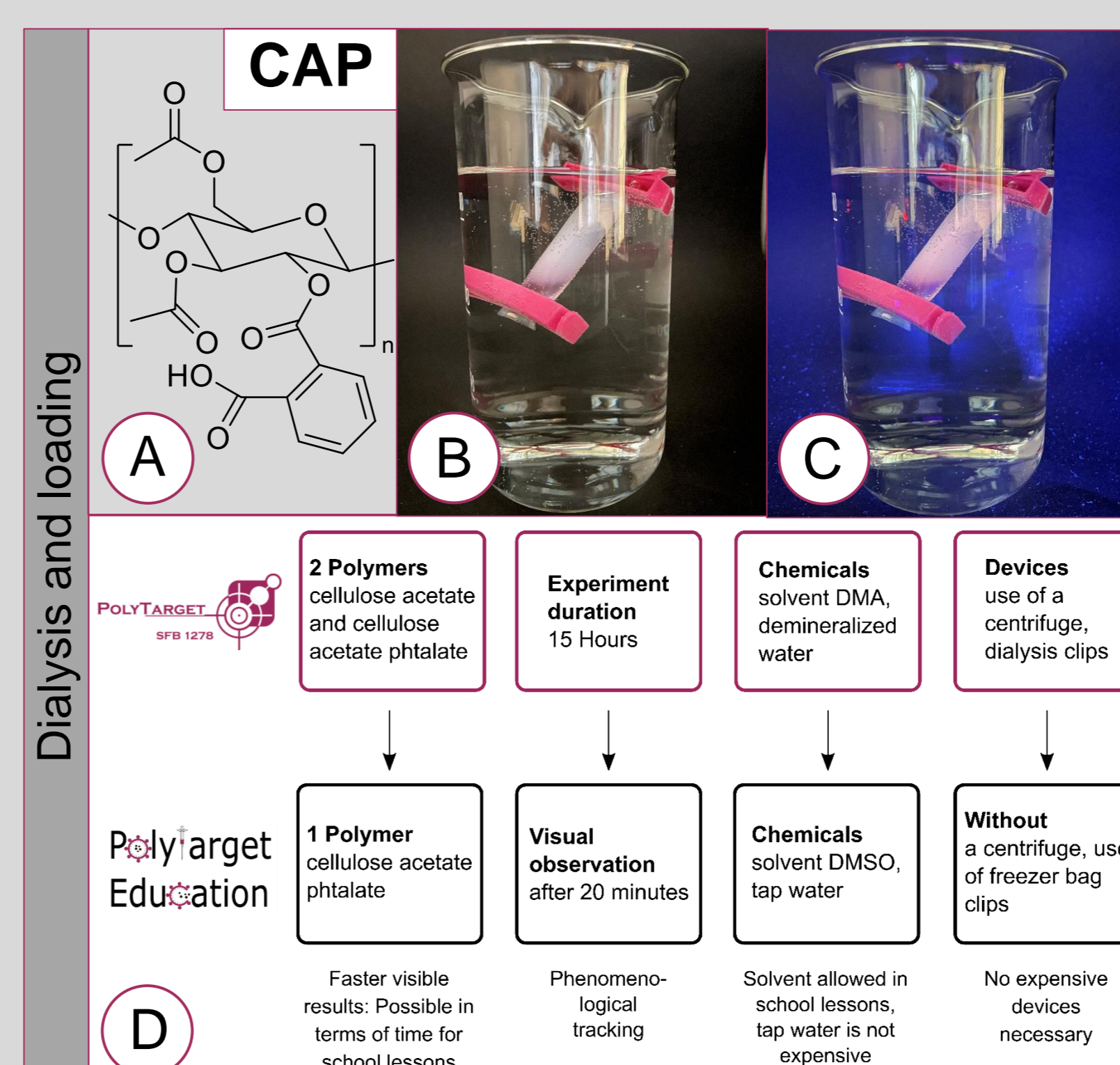
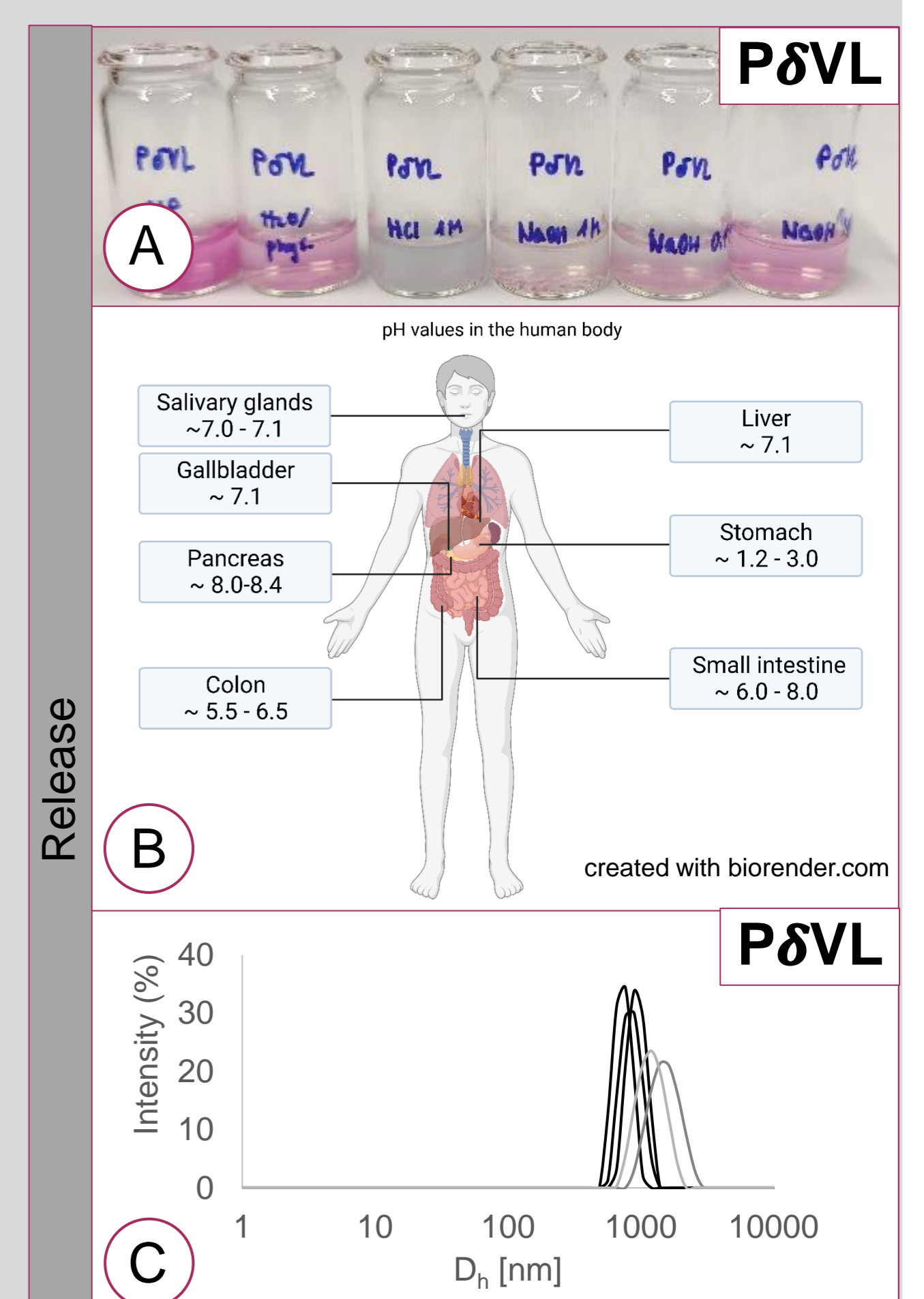


Figure 5: Top - Structural formula of CAP (A), dialysis after 15 minutes (loaded nanoparticles with Nile red): without UV light (B), with UV light (C), down - summary of the didactic simplifications (D)

Targeted release

Investigating the influence of different pH values and concentrations on the **release of dyes and active substances** from nanoparticles



Future work

Currently, the **experiments presented above are being further developed** in collaboration with A04. Regarding the encapsulation of curcumin, further polymers will be tested, and its release will be investigated. Concerning the nanoparticles formulated and loaded with the dialysis method, the release is also a current research focal point. Furthermore, in addition to the nanoprecipitation and dialysis method, the emulsion-based method will be taken up and made accessible to students. In addition, **empirical studies are being carried out** by means of a questionnaire in order to determine the prior knowledge and prejudices of the students. Thus, their interests and inclinations can be specifically addressed when creating the teaching materials. Affective variables, such as interest in dealing with the topic, also have a significant influence and will, therefore, be surveyed. In addition, the questionnaire will be used to **pilot the experiments and revise them** accordingly. The **teachers' perspective** will be included in another survey. The needs and possible concerns of the teachers are crucial for a successful transfer. In addition, the aim is to develop and offer a training course that is appealing to teachers.