

Cancer is currently one of the major diseases of civilization, so it is no wonder that in recent decades its research has been a priority for many laboratories. The problem of conventional treatment of oncological diseases, which dates to the beginning of the 1940s, is that it is non-specific to tumor cells and with that is connected a number of side effects. In recent years a new approach to the treatment of this serious disease has emerged that uses various nanotransporters (liposomes, proteins, but also inorganic carbon nanotubes), which can encapsulate cytostatics and release it in a targeted manner around the tumor, thus minimizing the side effects.

In this diploma thesis the encapsulation of three cytostatics (lenvatinib, adavosertib and sunitinib) into apoferritin was studied. Furthermore, the effect of the cavity of apoferritin on the biotransformation of encapsulated sunitinib; free and bound sunitinib biotransformation by liposome – bound biotransformation enzymes and last but not least, the release kinetics of sunitinib from the apoferritin central cavity were analysed.

Lenvatinib has not been shown to be a suitable cytostatic for encapsulation into the central cavity of apoferritin due to its low solubility and negative charge at basic pH. Adavosertib and sunitinib appear to be more suitable alternatives for targeted antitumor therapy by insertion into this nanotransporter. At the same time, the apoferritin cavity was found not to inhibit the metabolism of sunitinib by both microsomal fractions and cytochromes P450 family 1A1 encapsulated in liposomes. Finally, the experiments performed in this diploma thesis show that the release of sunitinib from apoferritin is faster in the environment of pH 6.5 compared to physiological pH 7.4.