Cancer is a crippling, challenging and frightening disease that can affect any part of the body. The global cancer epidemic remains a public health concern, as cancer is established as the second leading cause of death, as an example, in Poland, more than 170 000 new cases and a little more than 100 000 deaths were reported in 2022. Unfortunately, these figures are still deteriorating and the number of deaths is increasing year by year. Cancer is one of the leading causes of death around the world, and although the different clinical approaches have helped to increase survival rates, the incidence is still high and, therefore, its mortality. Chemotherapy based on the application of drug molecules is the only systemic approach that reaches cancer cells in all body tissues. A very common complication in immunosuppressed cancer patients is nosocomial infections. Hospitalised cancer patients are also affected by multidrug-resistant infections, often associated with considerable morbidity, mortality, and financial burden. Many of the surrounding infections are the same for cancer patients as for other hospital inpatients. Meticillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococci, multidrug-resistant gram-negative bacteria, such as pathogenic *Escherichia coli*, are common pathogens in cancer patients and are treated the same way as for other groups of patients.

In all countries, routine surgical operations required for cancer chemotherapy will become less safe without effective antibiotics to protect against infections. The need for new drugs with dual activity - anticancer and antimicrobial (especially against MRSA) is clearly visible.

An unmet social need for the development of new drugs with dual anticancer and antimicrobial activities requires extensive efforts of scientists and doctors. It is consistent with a precautionary approach, and national and international multisectoral action and collaboration should not be impeded by gaps in knowledge.

New drug molecules highly selective toward two different biological targets and possessing anticancer and antimicrobial activities are hardly available today. The ideal drug molecule should kill selectively human cancer cells and the pathogens cells (MRSA, *E. coli*, etc.) with high efficiency. Moreover, it should be very low toxicity to humans. The common features of potential drug candidates are high selectivity, non-toxicity, and safety for humans. The expected dual activity of potential drugs cannot be reached by simple organic molecules. High selectivity can be expected for complex three-dimensional drug molecules. The analysis of literature turns our attention to naturally occurring quinones and quinols. They have been identified as privileged groups of compounds with anticancer and antimicrobial activity. Until now, the most active compounds have been obtained from natural plants. However, their potential in combined therapies is limited due to their expensiveness and availability. Chemical syntheses and modification of known molecules are limited by existing chemical procedures. In our laboratory, new efficient and effective methods for complex quinones and quinols preparation were discovered. Using this methods, it is possible to generate highly active and selective drug molecules. Within the project, new derivatives of quinones and quinols will be prepared and tested as a drug candidate. Upon carefully designed and synthesised drug molecule dual activity in cancer therapy and infections will be tested. It will provide an answer on the general question regarding drug action; is the dual/combinatorial treatment of cancer and concurrent infections possible and effective. The possible positive response will open up a new field of research and medical treatments for patients with cancer.