In vitro biotransformation studies are an integral part of both toxicological research and drug development. They allow for a significant reduction of tests on human volunteers and provide detailed information about the metabolism of a given compound. Due to limited availability of human liver tissue, it is necessary to make use of alternative model systems and model animal species in the study of the interactions between biotransformation enzymes and xenobiotics. Since the activities of the most important human biotransformation enzymes are absent in the most commonly used laboratory species, rat, information gained in experiments with minipigs is very valuable.

Recombinant human biotransformation enzymes expressed in bacteria can be used in biotransformation studies in the form of isolated bacterial membranes. These model systems provide information about the metabolism of a given xenobiotic by a defined enzyme and thein advantages compared to purified enzymes include low cost and quicker and easier preparation with lower loss of enzymatic activity during isolation.

The aims of this study were:

1) To prepare a model system with recombinant human biotransformation enzymes expressed in bacterial membranes and to compare the properties of this system with minipig liver microsomes. To assess the usefulness of these two systems for the study of the interactions of compounds containing quinone in their structure with biotransformation enzymes.

2) To explore the molecular mechanisms of the toxic outcomes of the interaction between simple quinones and biotransformation enzymes.

3) To assess the possibilities of the use of minipig liver microsomes as a model system for the testing of the side effects of anthracyclines.