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DISSERTATION TITLE:	*Development of Electromembrane Extraction Technologies for Future Bioanalysis of Pharmaceuticals and Peptides*

I dette doktorgradsarbeidet ble en ny elektromembranekstraksjonsenhet med tynn og flat membran utviklet. Svært effektiv EME av legemidler og peptider ble oppnådd fra blod- og urinprøver. I tillegg ble selektiv EME og viktige fundamentale aspekter ved EME utforsket. Resultatene utgjør viktig kunnskap for utvikling og bruk av EME i fremtidens kjemiske og biokjemiske analyselaboratorier.

Exhaustive extraction of basic and acidic drugs was achieved from water samples and human plasma through development of a thin flat membrane-based device for electromembrane extraction (EME). Peptides were exhaustively extracted from water samples under stable and low system-current conditions. With a two-step strategy, a model peptide (angiotensin II antipeptide) was selectively extracted in the presence of other matrix peptides based on the isoelectric point. EME was integrated successfully with liquid-phase microextraction (LPME) under optimum conditions for both EME and LPME for simultaneous group separation of basic and acidic drugs from human plasma. EME system-current and efficiency was found to be dependent on the properties of the organic solvents used as supported liquid membrane, such as viscosity and Kamlet and Taft parameters. Solvents with high hydrogen bonding acidity (α) were found to be efficient for EME of acidic drugs, and hydrogen bonding interactions, dipole-dipole and hydrophobic interactions were involved in EME.

This PhD project gave us new insights into EME from both fundamental and practical points of view. The work during this PhD work discovered new possibilities of EME applications, and also addressed some of the challenges in EME. This is important for the future implementation of EME for bioanalysis of pharmaceuticals and peptides in the future.