

# Design and Process Development of Micro System for Pesticide Analysis

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## INTRODUCTION

Pesticides are widely used in agriculture around the world. Traces of pesticides can be found in the surrounding environment, streams, and groundwater and even in the agricultural products we purchase. Humans will inevitably come in contact with residual pesticides. The potential harm from pesticides is somewhat known, but not necessarily how it affects the human body. We want to study if pesticides can penetrate the cellular membrane, and if they can under which conditions.

## IDEA

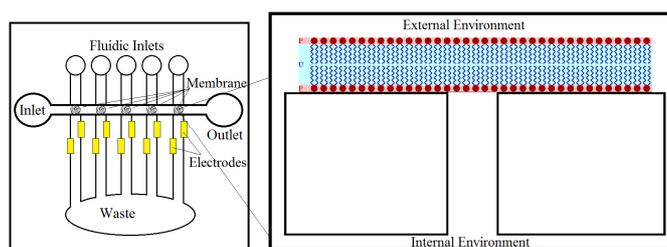
The idea is to have two fluidic flows separated by a cellular membrane. One flow simulates the internal environment of the cell and the other is the external environment of the cell. We use a lipid membrane, which allows small molecules to pass through the membrane. It has been shown in literature, that a lipid bilayer can be suspended over a nano sized hole (100nm<). We will design a biochip with a membrane on which the lipid bilayer can be suspended.

## DESIGN

The biochip will consist of one channel with five membranes. Underneath this channel five other channels are made. These channels will intersect with the main channel at the membrane so a transfer can take place between the top channel and the bottom channels. Having several channels underneath allows us to test the transport through the membrane under different conditions. (pH, buffer etc.) Detection is done electrochemically by placing electrodes at the five bottom channels.

## CONCLUSION AND OUTLOOK

In this project we designed the masks and the fabrications processes for fabricating a biochip, used to detect particle transport through a membrane. In the future this chip could be used to measure under which conditions different pesticides enter the cells of the human body. Besides pesticides it could also be interesting to see if nano particles pass through.



**Figure 1 - (left) Layout of the chip (right) Suspended membrane.**