SBE's Body-on-a-Chip Webinar by Professor Mike Shuler

Questions:

1. How long can the system be operated? What limits operation?
   We have operated 96 hours; build-up of metabolic by-products (e.g. lactate, ammonia) limit operation

2. Can it be made from materials other than silicon?
   We have made it from polystyrene, PDMS, any moldable plastic

3. Can it be operated in a high throughput mode?"
   Not currently, but we are working on modifications to simplify operation and permit simultaneous operation of 96 units

4. Given the complex responses of the human system, how many cell types are required to adequately model the targeted responses
   Depends on the question to be addressed in terms of selection of compartments. Four tissue/organs in one device is the most we have used.

5. An interesting and potentially more rapid application might be for measurement of bioactivity in a mechanism of activity specific method - has any work been done to develop this application?
   HuRel has licensed the technology, and they may have done this type of work

6. How do you know that the decrease in viability was not due to the Cyclosporin alone?
   Pretests in wells showed no toxicity at the concentrations used; but good point – we should run the system with cyclosporine alone

7. Could the system be amended to measure common liver toxicity markers, like ALT?
   Yes, we have done preliminary work with aspartate transaminase

8. Given that the unexpected concentration of drugs (e.g DOX) metabolites in the kidneys is a common source of toxicity, have you attempted a kidney compartment in the model?
   No, not yet. We have considered doing this, and there are appropriate cell lines available.

9. Do you think it will be possible to conduct experiments where feedback is used to control the overall dosage or dosage of each component drug?
   The dosage can be controlled by the method that drug is added to the reservoir/other tissues compartment. Drug could be added continuously or in response to measured values. It requires very good pump as very low flow rates for the dosing pump is required.