# Building a **PhageStat**

***A device to maintain a stable population of bacterial phage (virus)***

To build a **Phagestat**, you need:

1. A C*ellstat* producing a supply of (E. coli) host cells .
2. Precise control of multiple input and output flows

Inputs: Host cells and inducers

Outputs: Sampling and waste output

# Building a **CellStat**

***A device maintaining a population of un-infected host cells (E. coli) at optimal growth conditions***

To build a **Cellstat** you need:

1. A **Thermostat**, to maintain the culture at 37˚ C (98.6˚ F)
2. A **Turbidostat**, to maintain cell density with nutrient dilution
3. Isolation from bacterial phage:

**Cellstat** outflow is the **Phagestat** inflow

# Flow rate control

The ideal **Phagestat** has:

1. A flow rate sufficient to allow host cells to flow through in one cell lifetime, so the only mutations are in the phage sequence.
2. A flow rate low enough to prevent washout of phage even with large variations in the viral reproduction rate.

*Like all 'stats', a **Phagestat** cannot maintain an exact viral population count, but rather keeps it within a range. In the case of mutation experiments, the viral population numbers may have considerable variance within the two requirements above.*