

Synthetic biologist wants to elegantly engineer genomes

Synthetic biologist Hamilton Smith wants to find the smallest genome that will keep a bacterium alive – and tidy up evolution's sloppy work

You helped make the first synthetic cell, using an artificial version of the genome of the bacterium *Mycoplasma mycoides*. What are you doing with it?

Our goal is to throw away everything except the core genes that keep the cell alive, to make a reduced cell. Our best estimate is that we will end up with about 400 to 450 genes. To that end, we divided the synthetic genome into eight pieces and from each section removed all the genes we think are non-essential. Each of those eight pieces is viable when combined with the rest of the naturally occurring genome. The question was could we combine the eight pieces, have our reduced cell and be done?

And what was the answer?

It didn't work. But we found a number of combinations that did work. So right now we have a half-reduced genome. That grows pretty well. We're closing in on the full answer though.

What might a reduced cell enable?

Once we have it we can build on it. The interesting part is to add genetic sequences to enable the cell to grow in different environments, make different compounds, or use photosynthesis, for example.

So you're tidying up the genome?

We want to see how much we can make it a more understandable genome. Genes to do with translation of DNA into proteins over here, cell replication over here, transport over here.

Read the full, original story: [I'm homing in on the genetic essence of life](#)