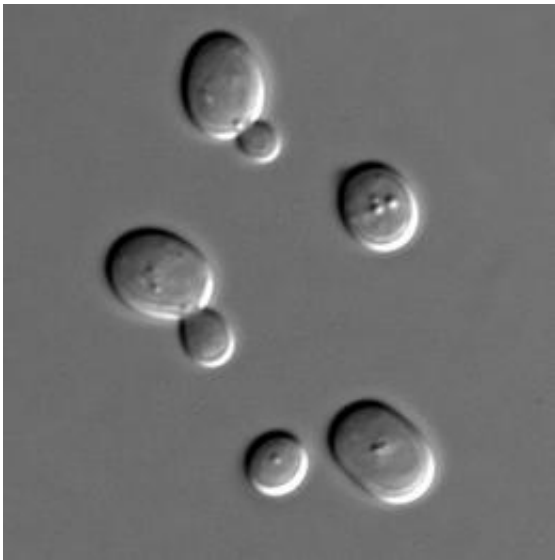


Multinational effort underway to build synthetic yeast using artificial chromosomes

July 12 2013, by Bob Yirka



Sacharomyces cerevisiae cells in DIC microscopy. Credit: Wikipedia.

(Phys.org) —A multinational effort to replicate the genome of brewer's yeast has been launched. Led by Professor Jef Boeke of John Hopkins University in Baltimore, and with teams in China, India, Great Britain and other countries, the goal of the effort is to build artificial chromosomes to replace the 16 normally found in yeast cells. If successful, the effort will mark the first time the entire genome of an organism with a nucleus has been artificially replicated.

Besides the possibility of providing new insights into how chromosomes

work, the project hopes to also serve as a means of learning how to program an organism by altering its [genetic functions](#). Yeast with [artificial chromosomes](#), for example, could be programmed to serve as an engine to manufacture antibiotics, vaccines, biofuels, etc., instead of alcohol.

A team of scientists successfully replaced the DNA of a bacteria cell back in 2010, but it had no nucleus, meaning it was a much simpler organism. Replicating all of the chromosomes in a yeast cell will require far more effort. For that reason, the work has been split between teams working at various facilities around the world. Each team will design one chromosome on a computer, which will then be sent to a central facility for its actual creation. Once all of the teams have built their chromosomes, a single yeast cell will be stripped of its natural chromosomes to be replaced by their artificial counterparts—giving it an entirely artificial [genome](#). The project is expected to be expensive—the British team alone has received £1m from the U.K government to fulfill its part in the project which is expected to be completed by 2017.

The yeast cell was picked for the project because it is a relatively [simple organism](#)—it's one celled and has only 6000 genes. One the other hand, it's sufficiently complex to further the science of bioengineering. Another plus is that yeast, because of its ability to convert sugars to alcohol, is seen as a becoming a more useful organism if its DNA could be controlled directly by creating new [chromosomes](#) in the lab and replacing the ones that nature gave it.

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