

Synthia

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Introduction

Synthia is a word that meaning something is made by human beings. But here is not only meaning a production that human made but also a life that can **reproduce itself**. In nowadays **E.Coli** and **Mycoplasma** can be created by human beings. But the first is Mycoplasma. The first human-made mycoplasma is made by the **digital code in the computer** and it built in a chromosome from four bottle of chemicals. Assmby that **chromosome** in **yeast** and transplating it into a recipient bacteria cell and transforming that cell into a new bacteria species. This is the first self-replicating species whoes parent is a computer. It also is the first species that have its own website encoded in its genetic code

What

What is Synthia? Synthia is a **chemically synthesized genome** of a mycoplasma cell based entirely on synthetic DNA which can self replicate has been referred to as mycoplasma laboratorium.

Why

Why human build this bacterium? According to the bacterium's father, Venter, said this synthetic bacteria are a step towards creating organisms to **manufacture hydrogen and biofuels** and also to **abosorb carbon dioxide** and greenhouse gases.

When

When was our human built? Synthia was built on May 21, 2010. Before this day, the team had tried over and over again from 1995, the team was at the institute TIGR, they were involved in sequencing the first two genomes in history. They thought it could there be even a smaller genome? Could we understand the basis of cellular life at the genetic level? Then the quest had been 15 years. In 2010 they answered the question.

Where

Where can Synthia be used? In nowadays, where it can be used we can't know. But the creator - Venter hopes that it can be used to **manufacture hydrogen and biofuels** and also to **absorb carbon dioxide** and greenhouse gases. We can hope that someday these wishes can be realized.

Who

Who is the creator of Synthia? The creator of Synthia is **J. Craig Venter**. He is an American biologist, entrepreneur, and geneticist. He is the founder of the Institute for Genomic Research and the founder and CEO of Synthetic Genomics, Inc. He is also the founder of Human Longevity, Inc. and the J. Craig Venter Institute. He is also the founder of the Human Genome Project.

How

How to create Synthia? To build a Synthia you first do is **sequencing** the genome, then **coding the genome**. So here is a problem, how to check the genome can be a life or a species? The answer is **transplanting** the genome into other bacteria. The team created the first synthetic life in 2010, putting the **fragments** in **yeast** and yeast would **assemble** these for us.

And then we have the other problem, our bacterial chromosomes are growing in yeast. So how to get the chromosome out of the yeast? So in addition to doing the transplanting, they had to find out how to get a bacterial chromosome out of the **eukaryotic yeast** into a form where they could be **transplanted** into a recipient cell. So the team developed new techniques for actually growing, cloning entire bacterial chromosomes in yeast. So they took the same **Mycoplasma** genome that the team member, Carole, had initially transplanted, and they grew it in yeast as an **artificial chromosome**.

So now we have the chromosomes. But it can't transplant and boot up a cell. In order to boot up and transplant a cell, the team found that the DNA in bacterial cell was actually

methyated, and the mathylation protects it from the **restriction enzyme** from **digesting** the DNA. Now we know if we took the chromosome out of yeast and metylated it, we could then transplant it.

If you follow the steps above, grow and transplant chromosome, you will get a new bacteria species(maybe). According to the team leader, Venter, said they was debugging the genome code error over and over again, so we can know how difficult it that to build a new species.

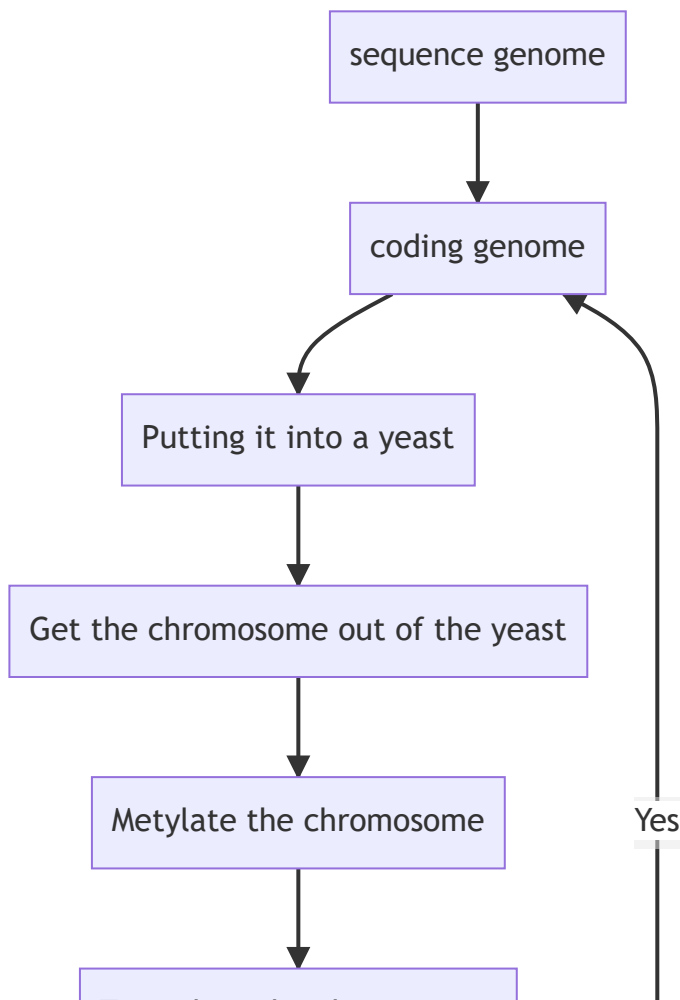
Above are the steps to create Synthia(simplified method). That's all of my homework. Thank you for reading.

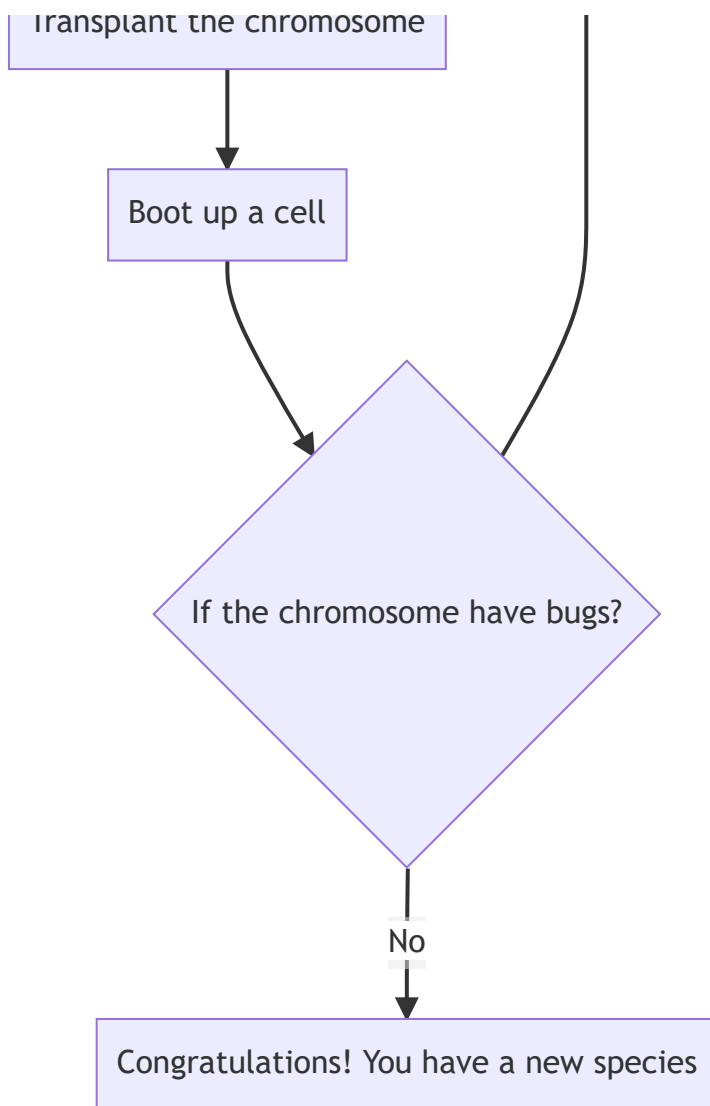
Conclusion

Venter who lead a team to build a bacteria in 2010 publish a research that a new species of bacteria is created by his team. And they named it Synthia. Synthia is a chemically synthesized genome of a mycoplasma cell based entirely on synthetic DNA which can self replicate has been referred to as mycoplasma laboratorium.

Concept Map

How to create Synthia





**Know 已知--****閱讀前：想一想我已學過的...**

I have learned a kind of bacteria it names mycoplasma
And it is the smallest bacteria, leak cell wall around their cell membranes.

**Learn 新知--從這單元我所學到的....**

The new I learned is in this world have a human-made mycoplasma.
And now I know how to synthtic a new mycoplasma. If I have chance I'll try to synthtic one.

Want to Know 想知--**閱讀前：問自己我想知道的...**

I want to know how to build a bacteria
In more precise is how to coding a bacteria
that's pretty cool

**Question 提問--****閱讀後：至少提出一個問題...**

I want to know is other way to coding a new bacteria? if so is it means that a excellent software engineer can be a great biologist?



給予一簡短有趣的標題

概念地圖區

文章原始題目, 作者, 出處

其他參考文獻

本圖感謝漳和國中Su-Huei Chang老師同意使用

下圖小貓來自 https://www.pinclipart.com/downpngs/iTmRxxo_funny-black-cat-clipart-public-domain-free-clipart/

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