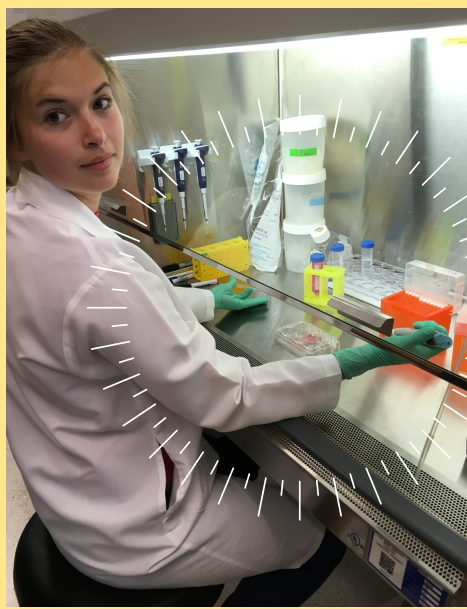


CELL CULTURE IN THE KITCHEN

What is cell culture?
Why do scientist do it?
How can you grow
cells at home?

CELLS AND SCIENTISTS...



Hello!

My name is Julia and I work in a biology lab at the University of Michigan.

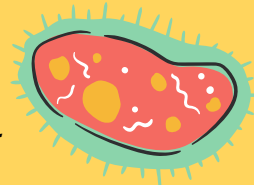
That's me in the picture - but what am I doing?
I'm taking care of cells!

My lab studies a vary rare type of skin cancer called Merkel Cell Carcinoma. There's still a lot that we don't know about this mysterious disease, and one of the ways we learn more is by growing cells in culture!

What are cells?

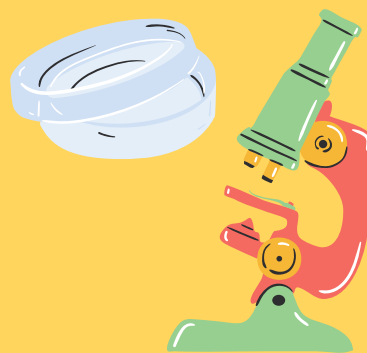
Cells are the smallest unit of life!

Big animals like humans are made of trillions of cells, but other organisms like bacteria and yeast are made of only one single cell.



Cancer Connection:

Normally, the production of new cells in the body is highly controlled to make sure that all cells can do their job properly. Cancer is a disease that happens when this control is disrupted, resulting in unregulated cell growth that intereferes with normal cell functions.



Why do scientists grow cells?

Scientists grow cells in special liquids called "media" that give the cells all the nutrients they need to stay alive. The technique of growing cells separately from the organism they came from is often called "tissue culture."

Scientists use tissue culture as an easy way to manipulate individual cell types and figure out what is going on with proteins and other molecules inside of cells

Fun Fact! Researchers use cancer cells grown in tissue culture to test how well new drug therapies for cancer work. Scientists need to grow more than 90 million cells for just one of these experiments!

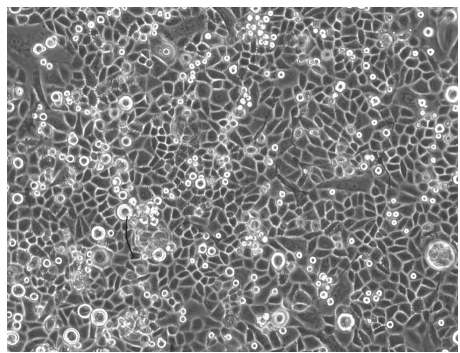
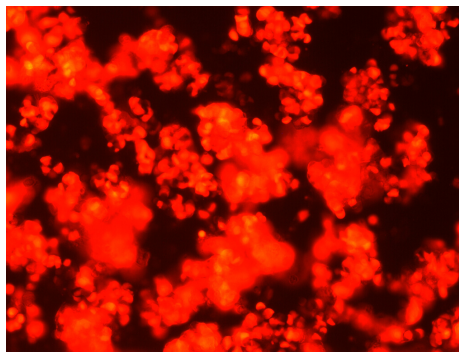
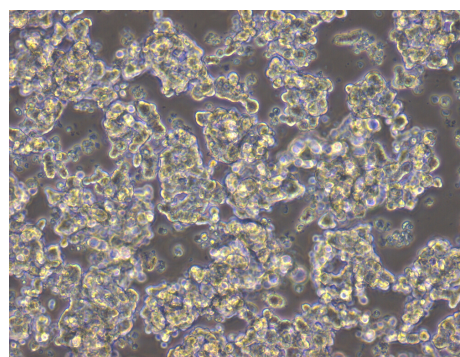
Q: Why are the cells in the middle picture glowing?

A: Scientists often use modified viruses as a way of over-expressing (making extra) or knocking out (getting rid of) certain proteins. They often design a fluorescent readout to show that cells were actually infected with the virus.

Q: What is different about the cells in the top picture compared to the bottom picture?

A: The cells in the top photo are floating, or "in suspension," and the cells in the bottom photo are growing on the bottom of the plate, or "adherent."

Why? Because they're different types of cells! The top photo is of Merkel cell carcinoma cells from a human tumor sample. The bottom photo is of keratinocytes, or normal skin cells, isolated from the tail of a mouse.



To learn more about cells, check out the U-M Museum of Natural History's "Under the Microscope" exhibit on your next visit!

CELL CULTURE IN THE KITCHEN



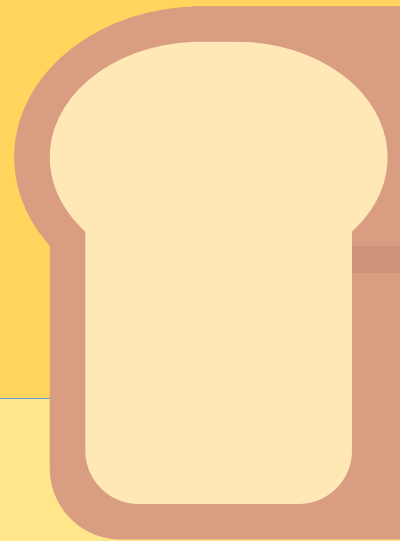
Try it at home!

Yeast – Bread cells?

Yeast is a single-celled organism that plays an important role in baking bread.

Have you ever noticed the tiny air bubbles in bread?

Yeast help these air bubbles grow through a process called fermentation, in which yeast use sugar for energy and produce carbon dioxide gas and ethanol as by products. The gas produced by yeast inflates existing air pockets like a balloon! Fermentation also helps contribute to the formation of gluten in bread, and gives breads like sourdough their characteristic flavor by acidifying the dough.

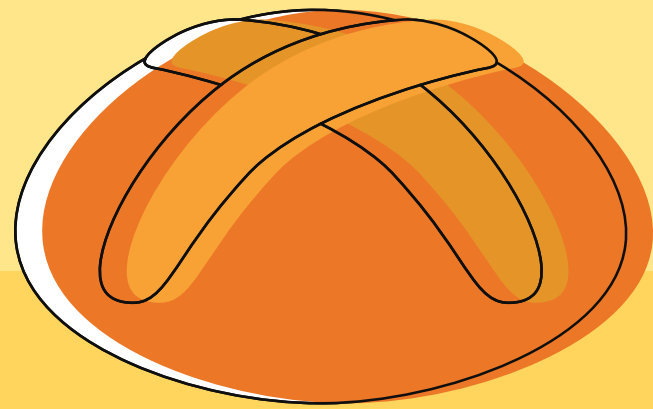


Recipe and Care

Sourdough starters are yeast cultures that can be used to bake bread. Much like the cells that scientists grow in labs, sourdough starters need to be taken care of each day. Follow the instructions below to make your own sourdough starter!

Materials:

- 1 teaspoon active dry yeast
- 2 cups of warm water
- 2 cups of all-purpose flour
- large glass bowl/jar
- spoon
- cloth or paper towel
- rubber band
- parental supervision



Sourdough Starter Instructions

1. In a large glass bowl or jar (at least 4 times larger than the final volume of water), stir together warm water and yeast until the yeast is dissolved
2. Mix in flour until the liquid is smooth
3. Cover jar with cloth or paper towel and secure with a rubber band (it is important that the yeast have access to air, but are not fully open to the environment)
4. Leave the starter in a warm spot on the counter for 5 days and stir the mixture well once every day - you should start to notice bubbles forming as fermentation occurs
5. After 5 days, you can use the starter to bake bread

OR move the mixture into the fridge and use or discard all except 1/2 cup of the starter and feed the remainder with 1 cup of flour and 1 cup of water once a week



After growing your yeast culture, you can finish the experiment by baking your bread!

Recipes for how to use your sourdough starter and additional care instructions can be found at: <https://www.kingarthurflour.com/recipes>

Information from:

- Corriher, S. (2007, April 2). Yeast's Crucial Roles in Breadbaking - Article. Retrieved from <https://www.finecooking.com/article/yeasts-crucial-roles-in-breadbaking>
- Yetter, E. (2020, January 29). This Basic Sourdough Starter is Simple Enough for Beginners. Retrieved from <https://www.thespruceeats.com/beginner-basic-sourdough-starter-428067>

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