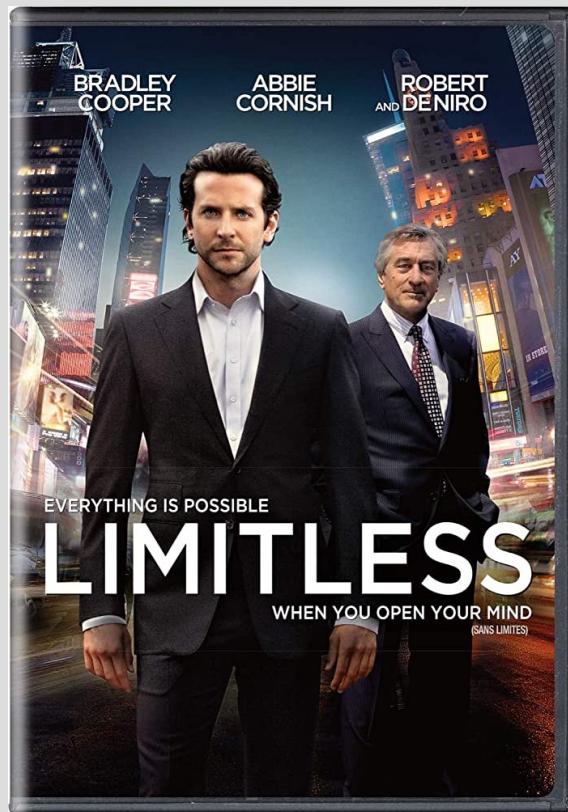


A background image showing several cells, likely yeast or similar microorganisms, with a brownish-orange hue. Some cells exhibit bright green fluorescence, particularly in the nucleus or a specific organelle. The cells are out of focus, creating a bokeh effect.

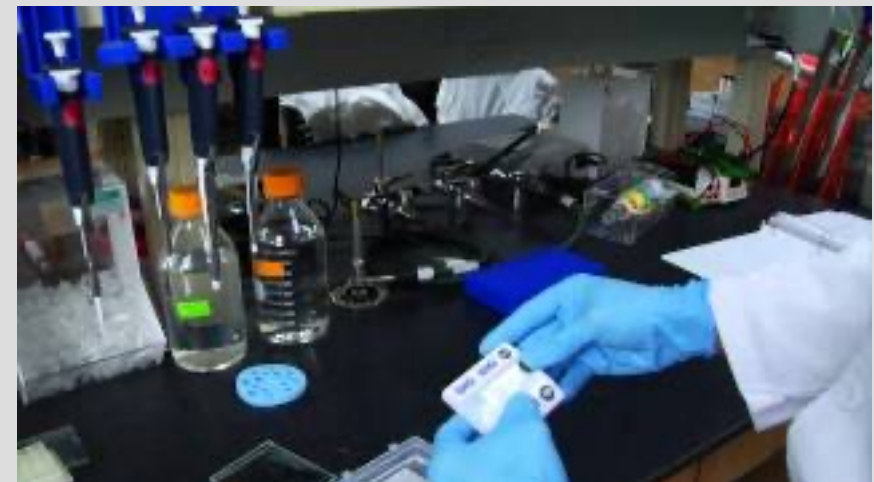
SCIENCE RIGHT NOW
Bo Price
March 15th

WHAT IS SCIENCE WHAT IS SCIFI?



WHERE EVERYTHING STARTED FOR ME

- Middle school biology class
- Field trip to Jordan Applied Technology Center



TECH CENTERS

- Offers career-based concurrent enrollment courses
- Classes during school hours
- Offer buses to the center
- Connected to further certificates and degrees
- Funded or affordable fees



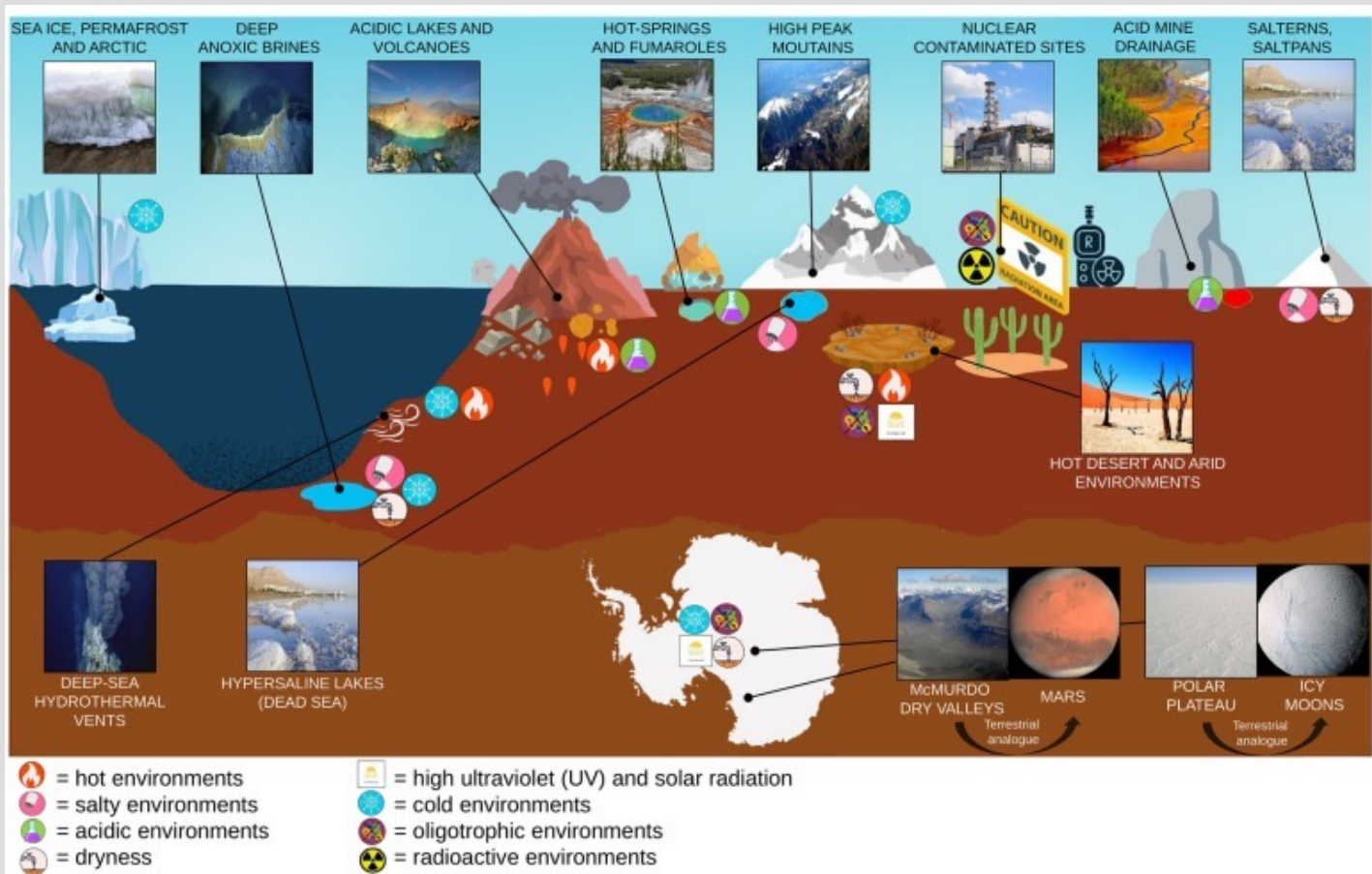
SALT LAKE COMMUNITY COLLEGE

- Biotechnology AS degree
- Internships
- Paid positions
- Multiple projects



EXTREMOPHILES

EXTREMOPHILES



WHY STUDY EXTREMOPHILES?

- 1976-*Thermus aquaticus*
- Yellowstone hot vents
- Taq polymerase



<https://www.biospace.com/article/dna-polymerase-market-growth-2022-2030-increasing-adoption-of-taq-dna-polymerase-for-thermal-tolerance-and-high-efficiency/>

WHY STUDY EXTREMOPHILES?

- *1976-Thermus aquaticus*
- Yellowstone hot vents
- Taq polymerase
- Kary Mullis-Nobel Prize winner
- 1990's- Sold patent for 330 million/
2 billion in royalties
- Expected to be 580 million dollar market
in 2030



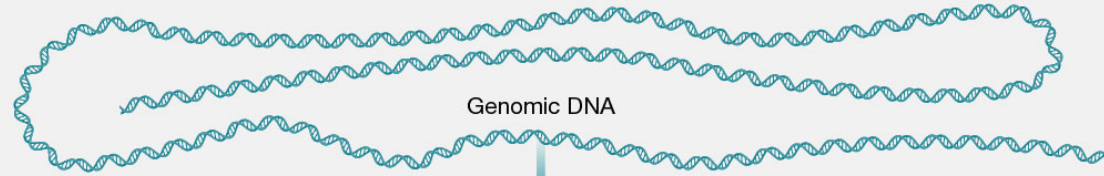
<https://www.biospace.com/article/dna-polymerase-market-growth-2022-2030-increasing-adoption-of-taq-dna-polymerase-for-thermal-tolerance-and-high-efficiency/>

EXTREMOPHILES

- *Halorubrum salsolis*
- From the Great Salt Lake
- Sequencing *H. salsolis* genome



3 million base pairs



Genomic DNA



Fragmented DNA

1000 base pairs fragments



DNA sequencing



DNA sequence reads



AGCTGTGCG	ATGATCGTGC	GGCGCTATAGC	GGCTAGAGCCC	TTAGCTAGCTGA	ATGCTAGCTGTAC	GGTCGATGC	GGCCCCAT	TTATGCCGAG
TTATGCCGAG	GCTCTGATGC	TTCTCGAGAGCG	ATTAGCTGCTGA	GCGTTAGCTAGC	GGTCGATGCTA	ATGCTAGCTGTAC	GGTCGATGC	GAGATGCTAGC
CGCGTATATTA	TTGCATGC	CCTAGGGA	AAGCGCGTAGC	ATGATCGTGC	GCGCGTAGCCC	GGTCGATGC	TAGCTAGCTGTG	ATGCTAGCTGTAC
CGCGTAGCCGTA	GGCTAGAGCCC	GGCCGATTAC	CGCGTATATTA	TTAGCTGATCGGT	GCTCTGATGC	ATGATCGTGC	GTCGATGCTA	CGCGCGGCAT
							TTATGCCGAG	CCTAGGGA
								TTGCATGC

Assembly of DNA sequence reads



Assembled DNA sequence

GCTACCAGGCTAGGTTACAGTGCATGCATACACGTAAGCTATACGGATCGTAGGCTAGCTAGCTAGTCGTAGCTAGCTG

OPPORTUNITIES ARE EVERYWHERE

Utah State University

- 10 week summer internship
- Transfer scholarship (AS to BS degree)
- Lab technician job
- Federal pell grants
- University scholarships
- University Research grants
- Travel grant awards
- National societies research Grant

OPPORTUNITIES ARE EVERYWHERE

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- University scholarships-
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- Travel grant awards-
- National societies research Grant-

Requirements for application

- 2 page application
- transfer from SLCC to USU 3.5 GPA
- continued after summer internship
- file as an independent on taxes
- 700 word essay
- 5 page research application
- signed up for national conference
- 2 page research application

SUMMER INTERNSHIP PROGRAMS

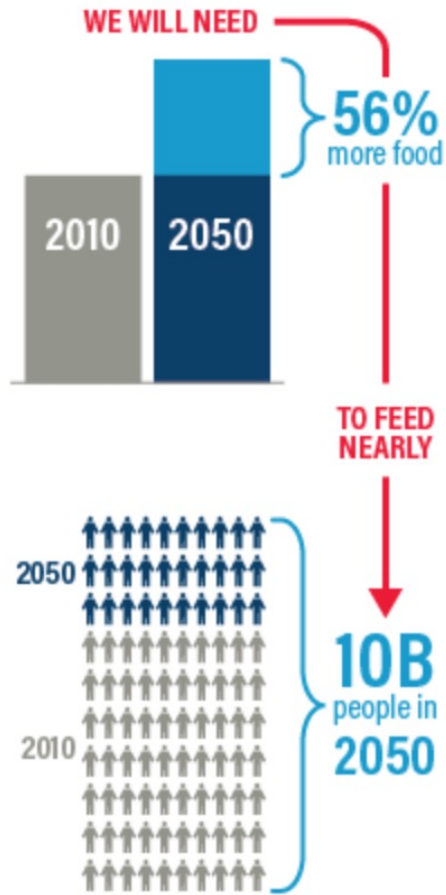
- Generally 8-10 weeks long
- Most large undergraduate universities
- Offer housing and stipend
- Specific training experiences within academic labs
- Involved with a lot of diversity inclusion programs
- Incentivizing for you to transfer from smaller universities or community colleges

CREATING A SUSTAINABLE FOOD FUTURE BY 2050

How do we feed
10 billion people...

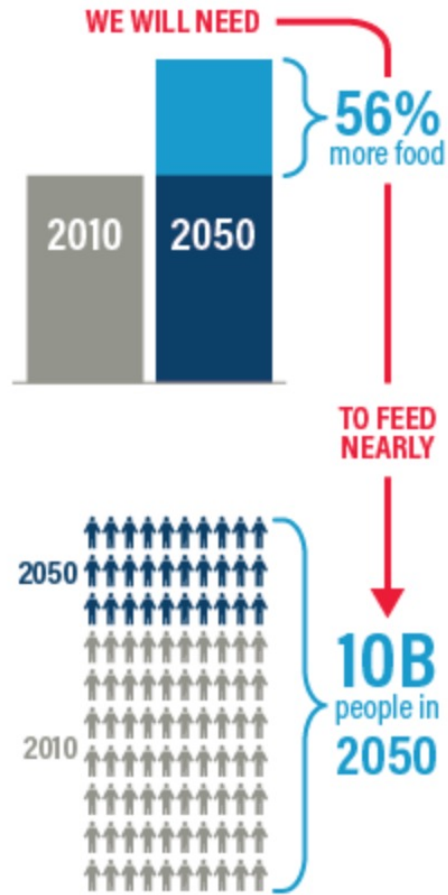
...without using
more land...

...while lowering
emissions?



CREATING A SUSTAINABLE FOOD FUTURE BY 2050

How do we feed
10 billion people...



...without using
more land...

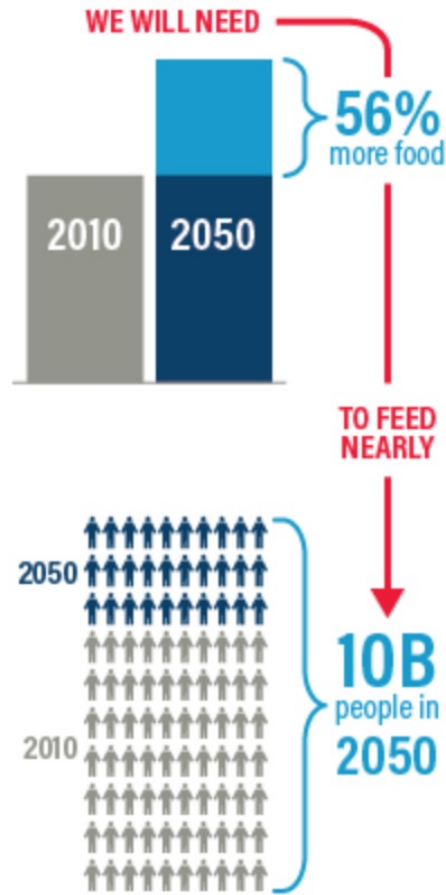
**WE NEED TO PREVENT AGRICULTURE
FROM EXPANDING**



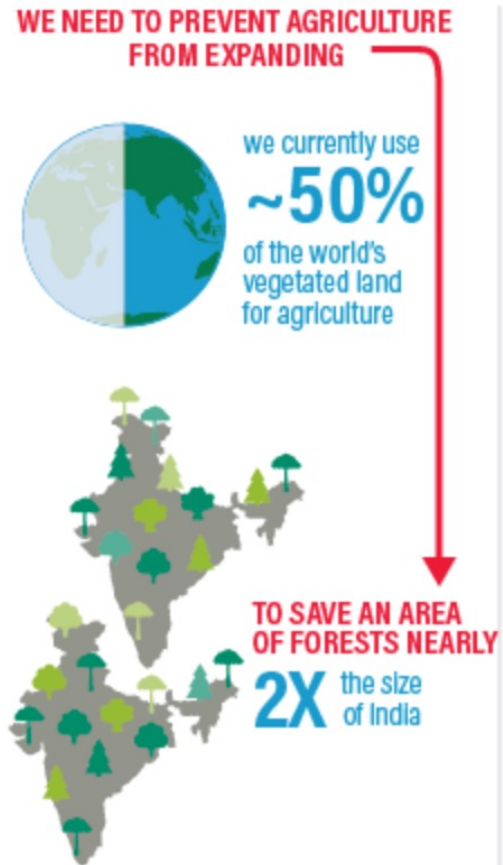
...while lowering
emissions?

CREATING A SUSTAINABLE FOOD FUTURE BY 2050

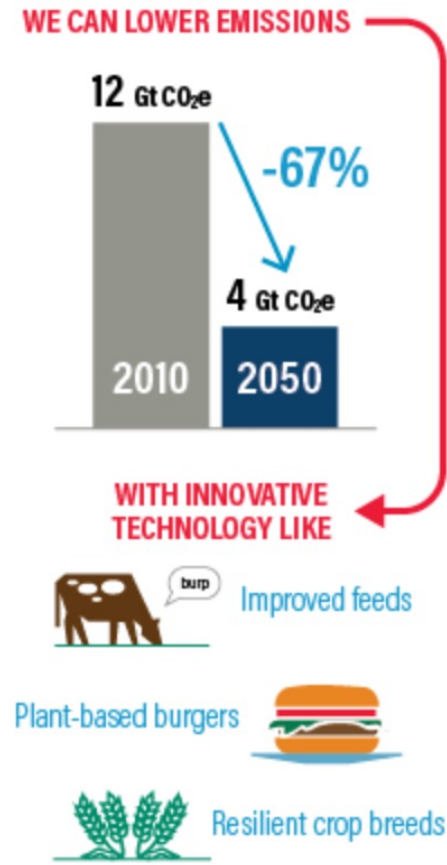
How do we feed 10 billion people...



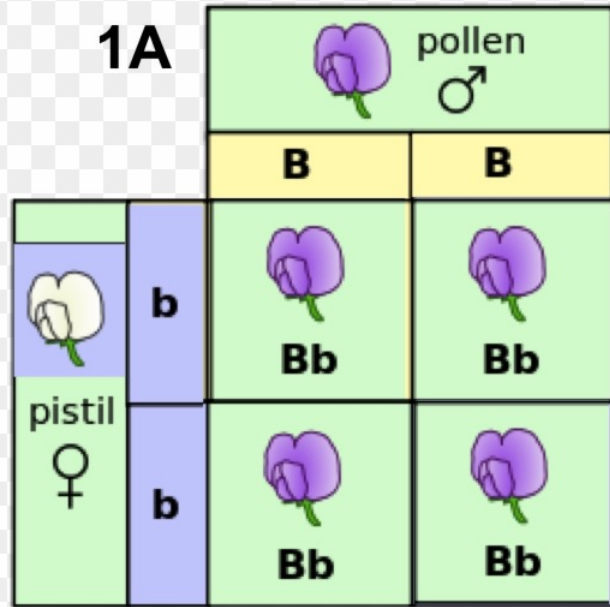
...without using more land...

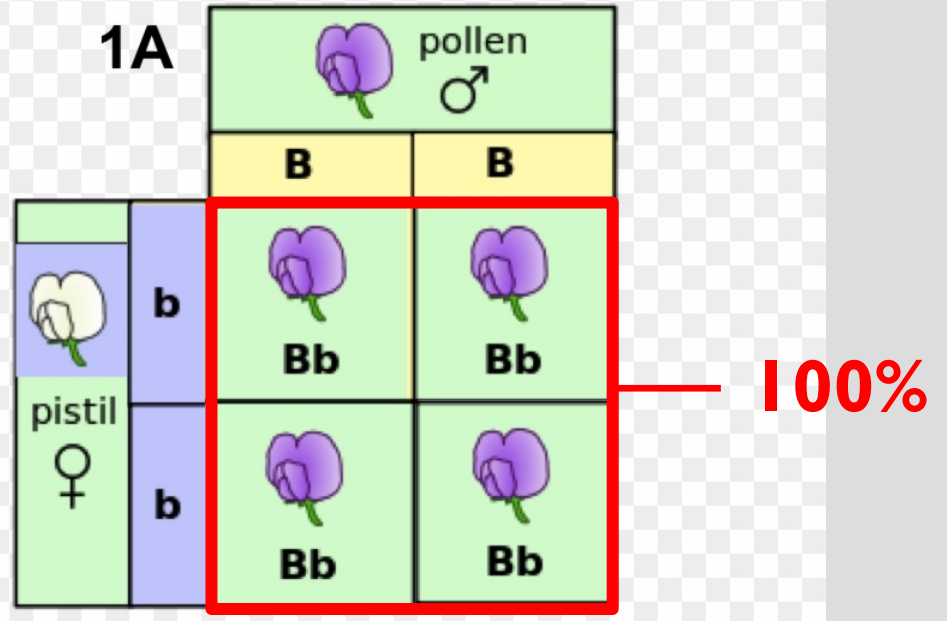


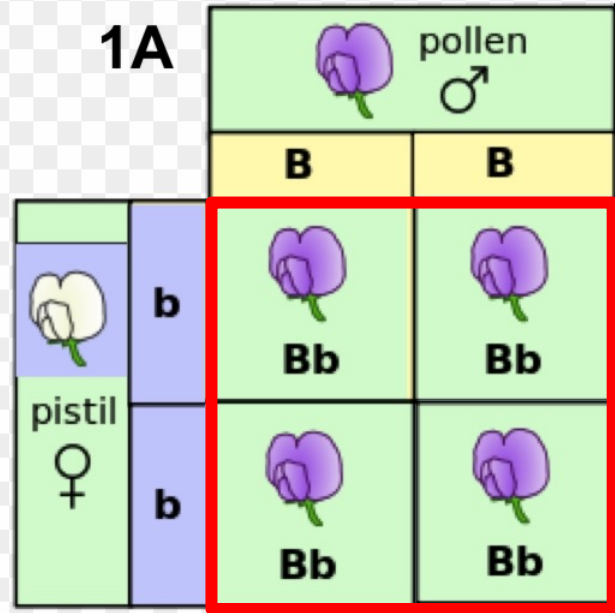
...while lowering emissions?



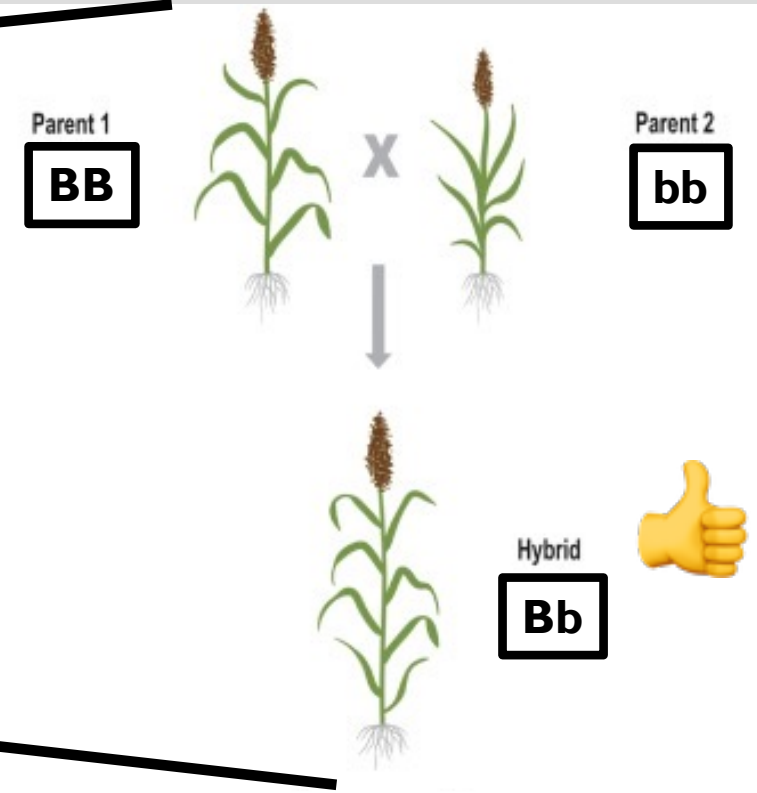
1A

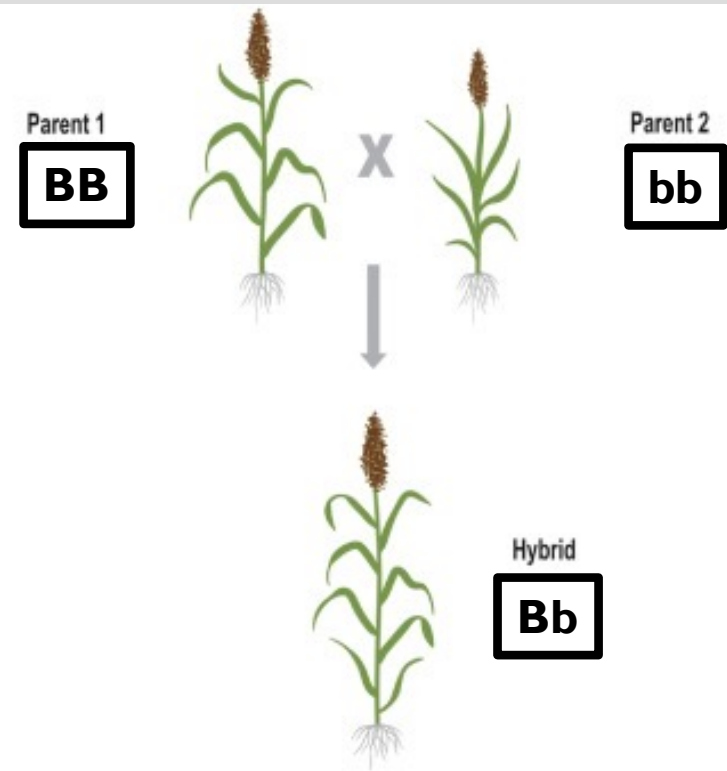
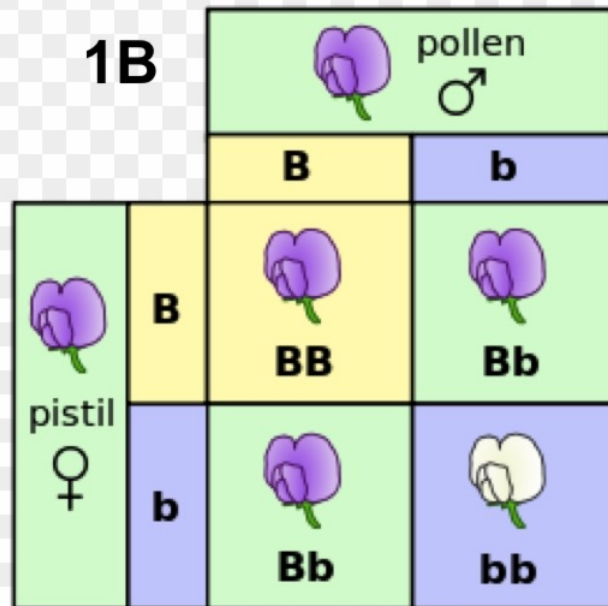
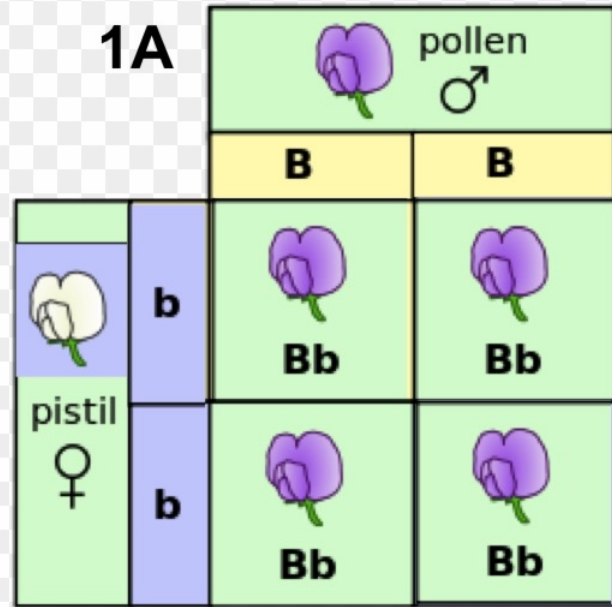


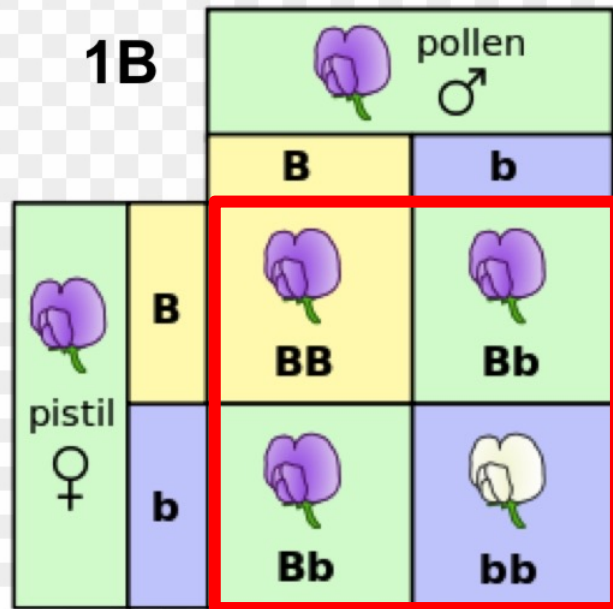
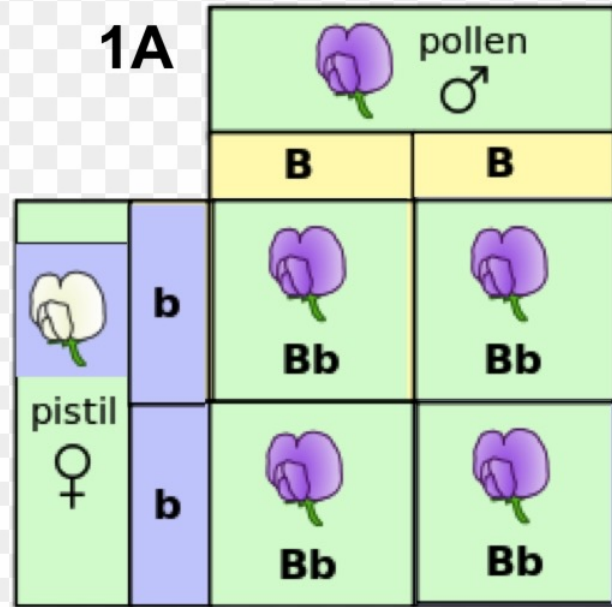




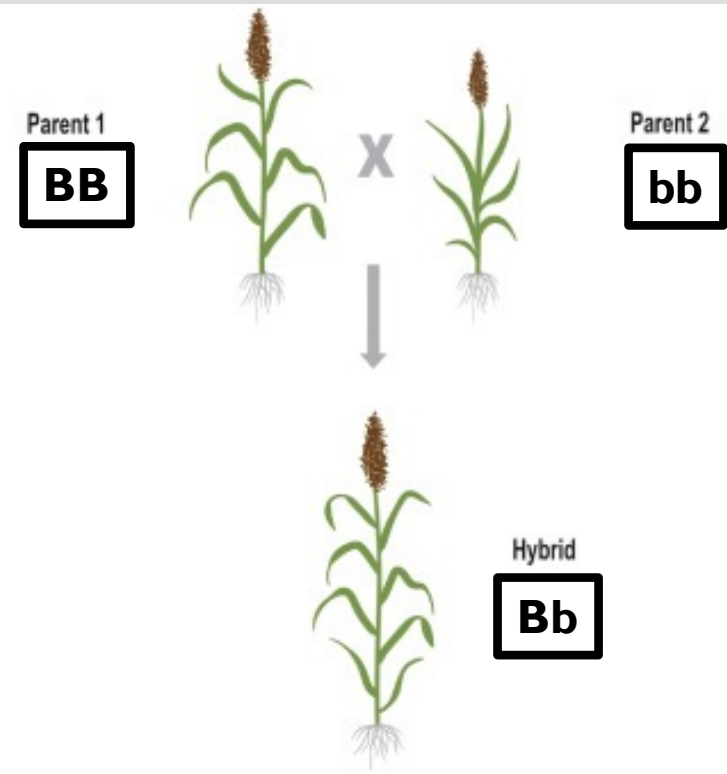
100%

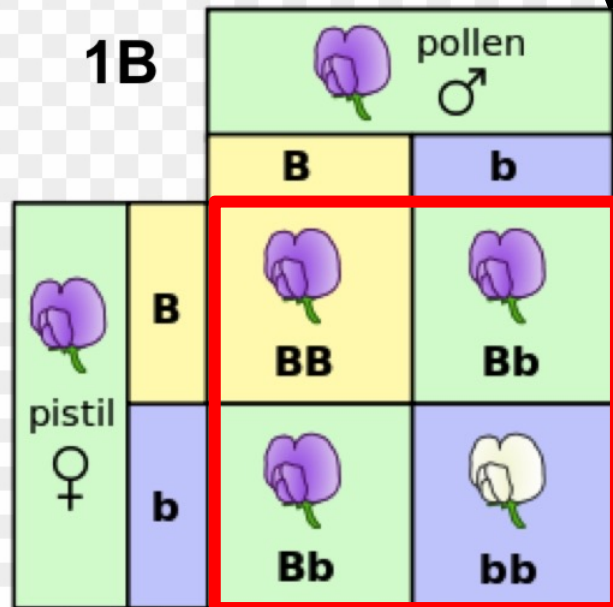
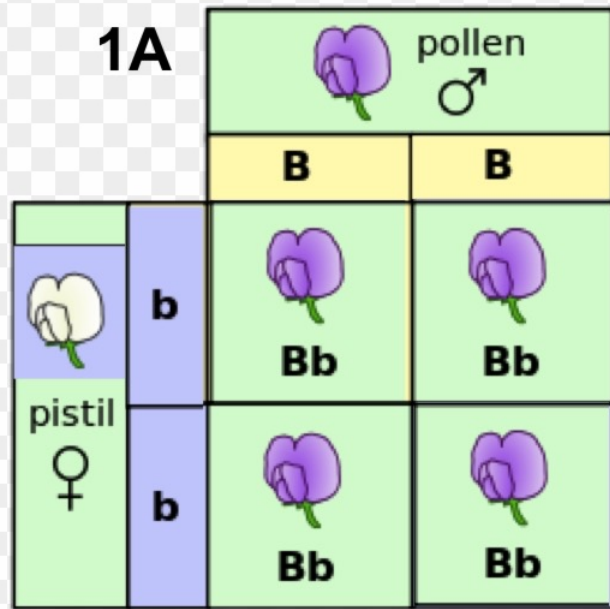




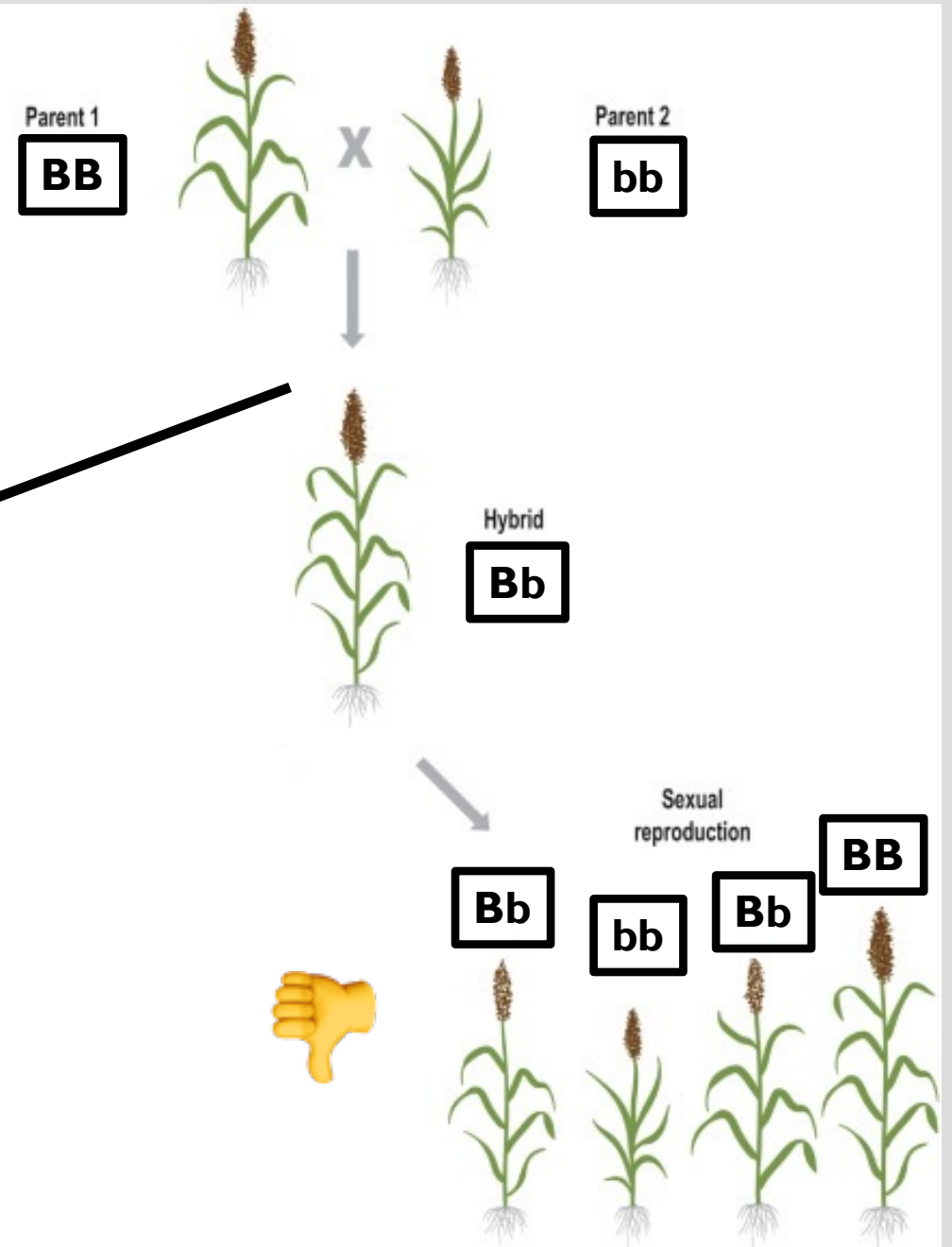


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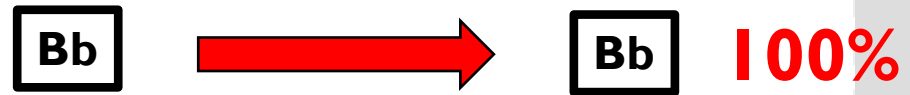




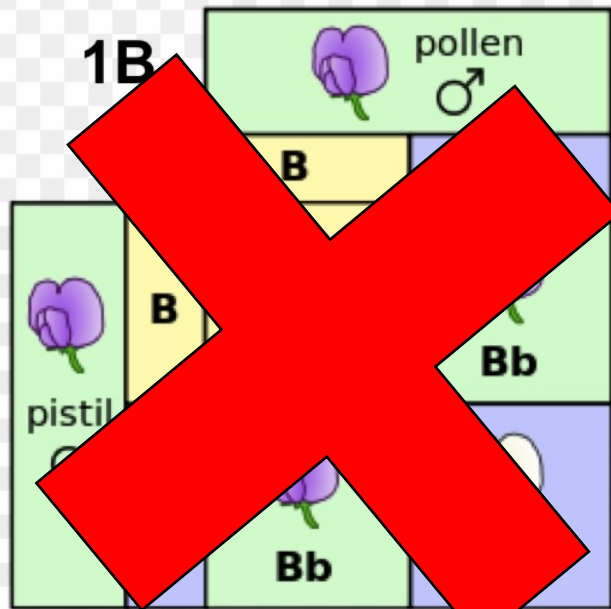
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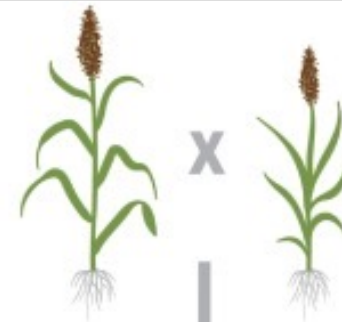
Asexual reproduction



No pollen needed!



Parent 1
BB



X

Parent 2
bb



Hybrid
Bb



Clonal

Apomictic reproduction

Bb **Bb** **Bb** **Bb**

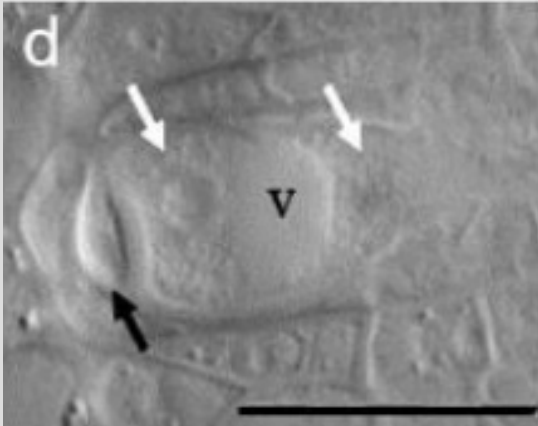
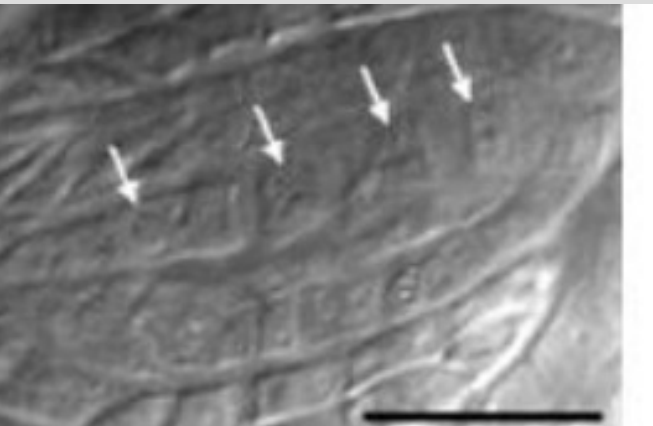


APOMIXIS

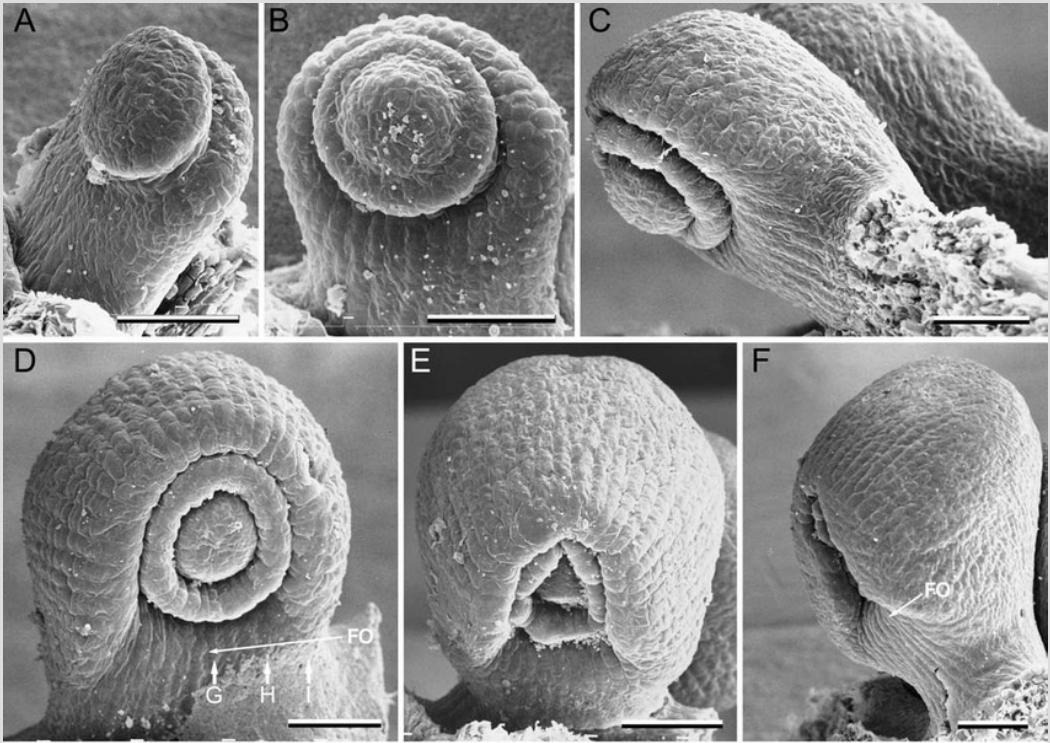
- Apomixis = away from mixing
- Developing germline cells within flowers skip one cell division
- No longer requires pollen to fertilize seed
- Seed grows into clone of mother plant
- Some flowering plants are naturally apomictic

Sexual (4 cells)

Asexual (2 cell)

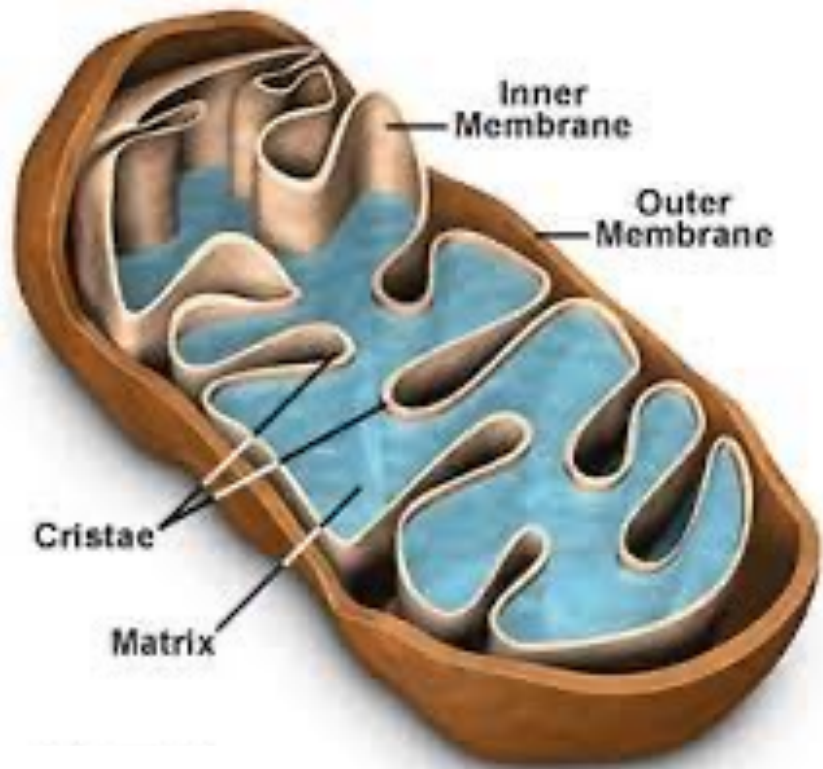


Ovule (developing seed in plant)



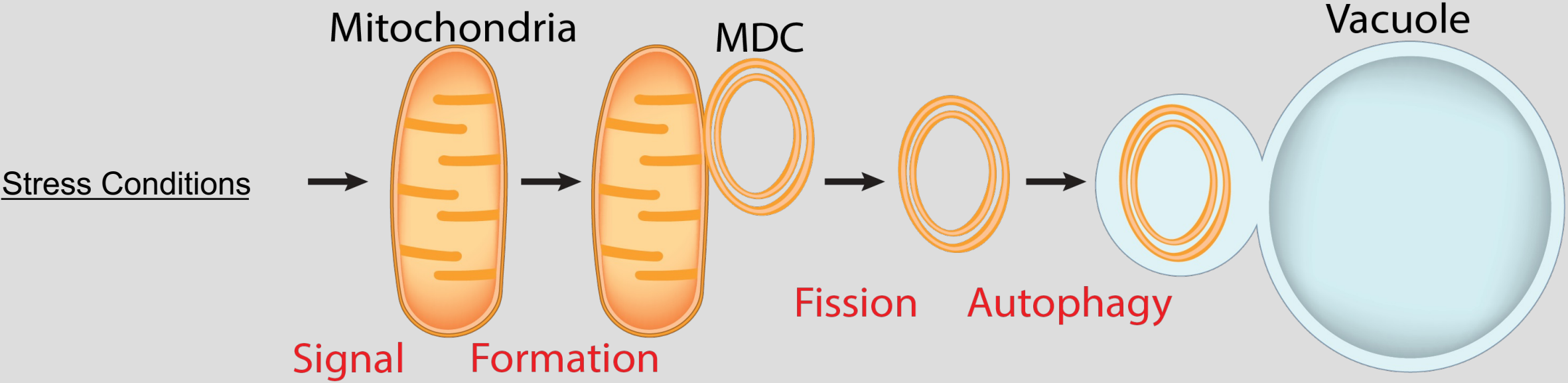
THE MITOCHONDRIA

Mitochondria Structural Features

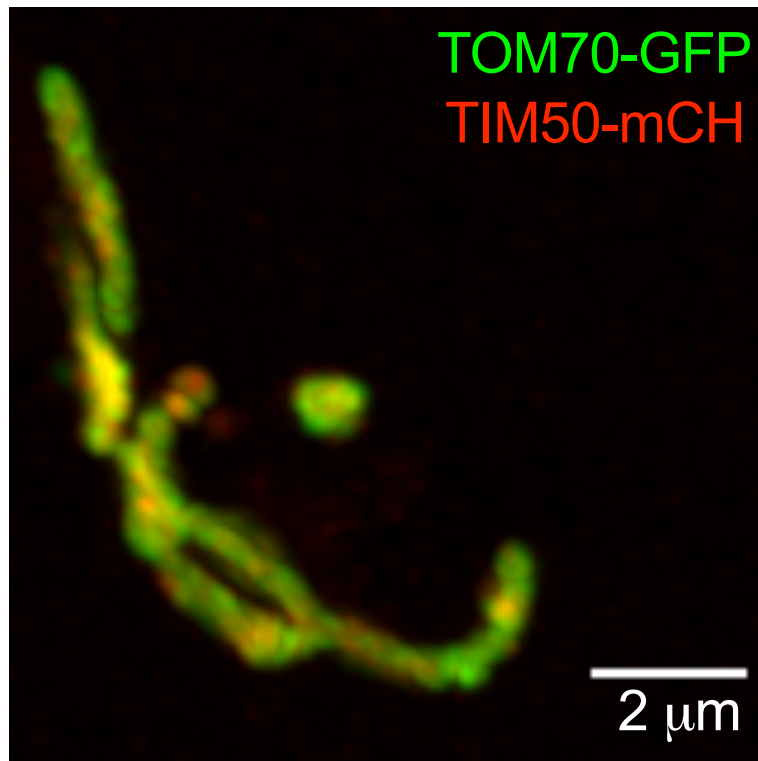


- Makes energy! (ATP)
- Sugars
- Fats
- Proteins
- Compartmentalizes enzymes and metabolites
- Makes building blocks for the cells
- Signals to the cells

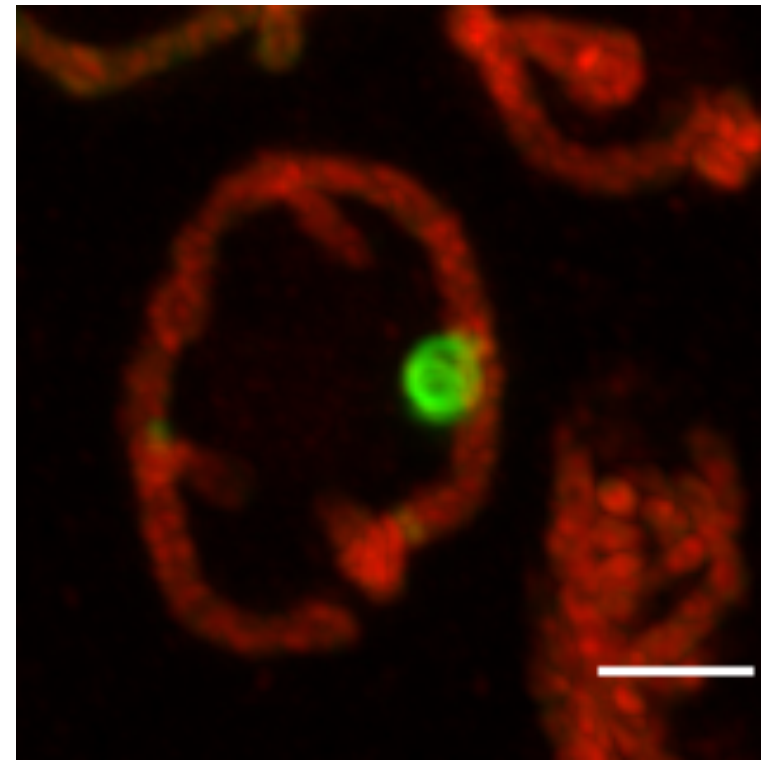
MITOCHONDRIAL DERIVED COMPARTMENTS



MITOCHONDRIAL DERIVED COMPARTMENTS



2% Glucose



No Glucose Added

Yeast Extract + Peptone

MITOCHONDRIAL-DERIVED COMPARTMENTS

