

# PLANT BIOLOGY WITH PROFESSOR DAVE JACKSON

## TALKING POINTS

### KNOWLEDGE

1. What are plasmodesmata?
2. List three reasons why plant cells need to communicate.

### COMPREHENSION

3. Summarise how the MS2 tagging technique works.
4. What is the difference between direct and indirect cell communication?

### APPLICATION

5. How might Dave and his team figure out how the RNA binding protein attaches to the KNOTTED1 RNA molecule?

### ANALYSIS

6. How do you think applied research might differ from fundamental research?
7. What are some of the possible pros and cons of fundamental research?

### SYNTHESIS

8. Aside from development, what other aspects of plant biology may prove useful to study?

### EVALUATION

9. To what extent do you believe that fundamental plant biology is a good way to find solutions to climate change, food security and other issues?

## MORE RESOURCES

- Find out about the education programmes offered by Cold Spring Harbor Lab Laboratory: [www.cshl.edu/education](http://www.cshl.edu/education)
- Get involved with the science taking place at Dave's lab: [www.cshl.edu/lab-life-a-step-for-students-a-leap-for-science](http://www.cshl.edu/lab-life-a-step-for-students-a-leap-for-science)
- Take a closer look at how the science at Dave's lab might revolutionise the food industry: [www.ediblelongisland.com/2018/06/11/what-does-cold-spring-harbor-laboratory-do-with-food](http://www.ediblelongisland.com/2018/06/11/what-does-cold-spring-harbor-laboratory-do-with-food)
- Read about Genspace, the citizen science group that Dave works with: [www.genspace.org](http://www.genspace.org)
- Try out this guided meditation that focuses on the beauty of plant life: [www.oakproject.org.uk/projects/great-oaks-from-little-acorns-grow](http://www.oakproject.org.uk/projects/great-oaks-from-little-acorns-grow)
- Dave recommends this site which has free talks by biologists, including a section on plant biology: [www.ibiology.org/research-talks/plant-biology](http://www.ibiology.org/research-talks/plant-biology)

## ACTIVITIES

### 1. COMMUNICATE

Dave explains that it was listening to a talk at a conference that influenced the research path he took; science communication is vital for keeping science discoveries progressing and fellow scientists inspired.

Imagine you are a member of Dave's research team. You have been tasked with representing his work at the Cold Spring Harbor Laboratory at a plant biology conference and presenting the team's most recent findings.

Referring back to Dave's article, select the key information you need to present, and create diagrams/add illustrations to help explain the science. You will need to consider:

- the role of plasmodesmata
- RNA binding proteins
- the KNOTTED1 RNA signal molecule
- the use of MS2 tagging
- the observations the team made
- key successes, so far
- aims for the future

### 2. HOW INTEGRAL ARE PLANTS TO OUR DAILY LIVES?

Science communication is even more powerful when people understand the relevance to their everyday lives.

Throughout your day, take note of all the times you interact with or use plants or plant derivatives. This could be through the food you eat, the clothes you wear or the things that you use at school.

If you are unsure of where to start, have a look at the examples provided here:

[www.studyread.com/importance-plants-life-earth](http://www.studyread.com/importance-plants-life-earth)

### 3. OBSERVE MERISTEMS UNDER A MICROSCOPE

Dave explains, "Usually, meristems are buried inside many layers of leaves for protection and are hard to observe. However, cauliflower is a mutant version of a cabbage, where the white curd of the cauliflower that we eat is a mass of proliferating meristems."

If you take part of the curd and observe the surface under a microscope, you should be able to see a fractal pattern of bumps, and each of those bumps is a meristem.

If you do not have access to a microscope, search online for 'cauliflower scanning electron micrograph'.

The patterns that these meristems make follow a mathematical rule called the Fibonacci number. Dave asks, "How do you think these patterns are generated by the plant?"