The microfluidic network of a plant leaf

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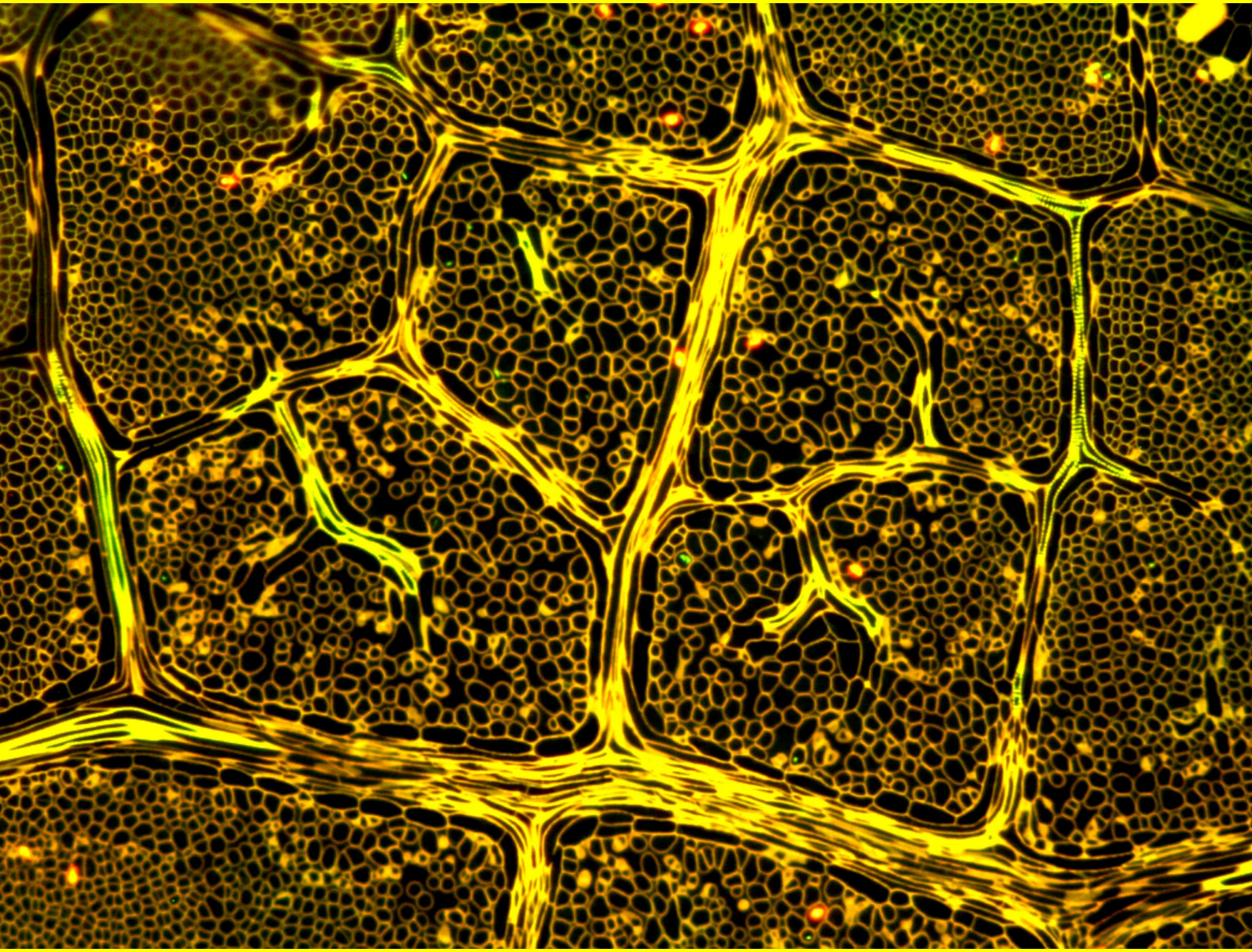

Plants are the basis for our life on earth: they produce the oxygen we breath and provide the food we eat – today only 30 different crops provide about 95% of human food-energy needs[a)]. Moreover, for the synthesis of sugars, plants absorb carbon dioxide from the atmosphere.

Fascinated by the intricate network architecture found in plant leaves, we are looking for optimization principles governing the fluid flow inside veins. How many veins are necessary? What is the most efficient diameter?

This light microscopy image of a birch leaf shows the microfluidic conduits, which transport sugars and water. The veins connect to each other, forming loops that enclose sugar producing cells. Most sugars are taking up into the conduits at the endings of the smallest veins.

Image size: 525x700µm

a) Food and Agriculture Organization of the United Nations
www.fao.org/nr/cgrfa/cthemes/plants/en