Science Journeys

DAVID DELGADILLO

presents

Seeing Is Believing: Powerful Microscopes Help Us Discover Medicines in Nature

Continue THE Conversation

Try this simple demonstration to explore **diffusion**, the movement of molecules from an area where they are highly concentrated, or crowded, to an area where they are less concentrated. (You'll also end up with a refreshing drink!)

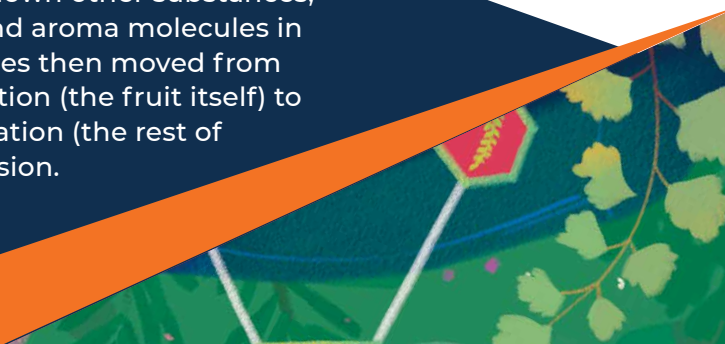
You'll need:

- A glass filled with one cup of drinkable water
- About two tablespoons of diced fruit

Mix the fruit into the water and allow it to sit overnight. Taste and smell the water the next day. What do you notice?

WHAT HAPPENED?

Water is a **solvent**, a substance—usually a liquid—that can break down other substances, in this case the flavor and aroma molecules in the fruit. Those molecules then moved from areas of high concentration (the fruit itself) to areas of lower concentration (the rest of the glass) through diffusion.



MEET

David Delgadillo

POSTDOCTORAL RESEARCH FELLOW

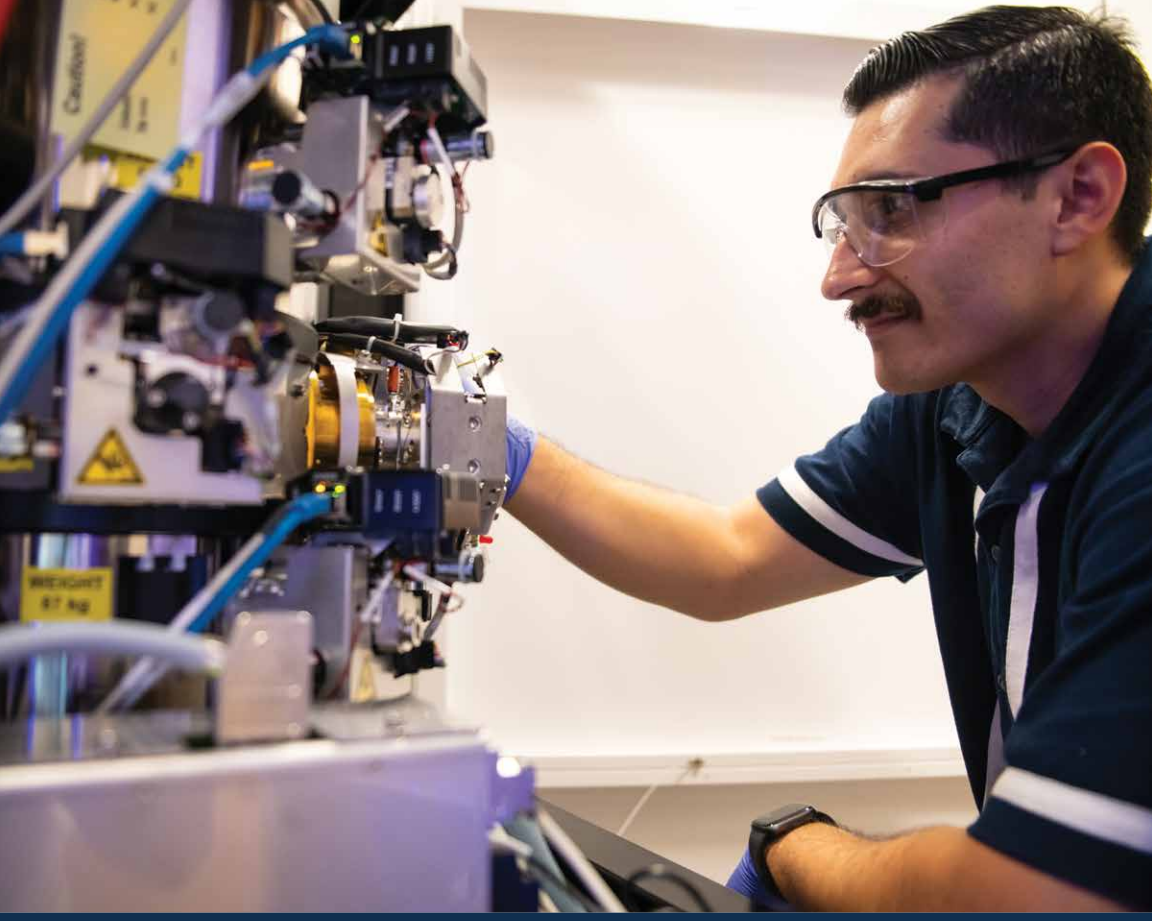
David and his grandfather

David Delgadillo is a postdoctoral research fellow at Caltech in the lab of Professor Hosea Nelson. His science journey began in the Los Angeles area, where he grew up in the cities of Bellflower and Hacienda Heights. Throughout his childhood, David was fortunate to have been immersed in nature by way of agriculture and through California's wonderful nature preserves.

Although he did not know it at the time, his summers spent among cows and horses on his grandfather's farm in the mountains of Jalisco, Mexico, exposed him to the beautiful synergy between chemistry and life. The way antibiotics brought life back into sickly livestock always sparked his curiosity: "How can something that I can't see with my own eyes have such a dramatic and beneficial effect?" This curiosity extended to the way medicine affected humans and drove David to pursue a degree in human biology at UC Merced. He went on to obtain his PhD in organic chemistry at UC Santa Cruz under the supervision of Professor John MacMillan, where he studied antibiotic and anticancer compounds produced by bacteria in the ocean.

David with cousins at the Huntington.

Outside of his research, David enjoys being out in nature, including camping, hiking, or simply roaming through a local botanical garden.



Explore THE Science

Like many, David sometimes took antibiotics when he was sick as a child. Growing up in an agricultural family, he also gave these medicines to farm animals. This sparked an insatiable desire to understand how seemingly invisible chemicals can dramatically cure illness.

In his talk, David will explore how humans throughout history have harnessed the medicinal properties of plants. He will also introduce some of the devices scientists use to figure out the structure of the chemicals responsible for medicinal effects.

Delving into his own research, David will share his discovery of a novel way to reveal new compounds in nature using a technique called electron diffraction—a method that can help us see the seemingly invisible. Join David for a presentation about curiosity and discovery.

Terms TO Know

- **Antibiotic:** Medicine or chemical compound that inhibits the growth of or destroys microorganisms (most commonly bacteria).
- **Antifungal:** Medicine or chemical compound that inhibits the growth of or destroys fungi.
- **Chromatography:** A lab technique for separating the various components of a mixture by passing the mixture through a medium.
- **Diffraction:** The spreading out of light or other waves as they pass through an aperture or around an object.
- **Distillation:** The action of purifying a liquid through a process of heating and cooling.
- **Natural Products:** Natural compound or substance produced by a living organism found in nature. In the context of the talk, we will refer to secondary metabolites (molecules produced by living organisms that are not absolutely required for survival) as natural products.
- **Solvent Extraction:** A method used to separate compounds (i.e., natural products) based on how much they dissolve in a solution.
- **X-rays:** A form of electromagnetic radiation, similar to visible light but with short wavelengths of less than 100 angstroms (one ten-billionth of a meter).

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WATCH David's talk, plus past events covering topics such as particle physics, underwater robots, and fossils

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