**Examining Stomata Using Imprints**

Leaf surfaces are generally air and water-tight, in order to prevent desiccation (drying out), and entry of harmful pathogens like bacteria, fungi, and insects. However, closer inspection with a microscope reveals that the epidermis is actually covered in tiny structures that look like mouths called “stomata” (singular: stoma). Each stoma is composed of two guard cells, which can use changes in turgor pressure to open and close a central, stomatal pore. When the pore is open, the leaf can “breathe”. This is the primary mechanism by which plants take up CO2 for photosynthesis.

Plants often vary in the number, size, and density of their stomata, depending on such factors as water availability, sunlight availability, and temperature. This can make them both interesting and diverse to examine. There are some plant biologists who devote their entire careers to the study of stomata!

Here, we will be using clear nail polish to make stomatal imprints from leaf surfaces. This technique is often used by plant biologists as a quick and relatively easy way to observe stomata. In contrast to epidermal peels, which shrivel and dry up within seconds to minutes, nail polish imprints can be stored and re-examined for decades.

1. Go outside and find two green leaves (not brown or dead) that differ in some characteristic (size, species, etc). Pick the leaves and bring them back to the lab.
2. Apply an even coat of clear nail polish to a dime-sized portion on the **leaf underside** (this is where most stomata are).
3. Allow the nailpolish dry for 15-20 minutes.
4. After the polish has dried, stick a piece cellulose tape directly onto the polish, and gently peel it back; the nailpolish should stick to the tape. Now place both directly onto a microscope slide. Flatten it with your finger. You do **not** need to add a coverslip.
5. Examine the leaf surface under the microscope. Once you are in focus on low power **(4x objective)**, move the objective to **medium power (10x),** and then **high power (40x).**