

The All-Purpose Foot

Nothing is more frustrating than glue that refuses to stick. And nothing is harder on an adhesive's ability to stick than water. Water can prevent adhesives from solidly touching the surfaces that are to adhere. Freezing and thawing temperatures can force glued surfaces apart. Yet, biological adhesives constantly work without fail in continual contact with water.

The mussel is the champion in the creation and use of biological adhesives. When a mussel finds a suitable spot, it extends its all-purpose foot. The foot, which is like a rubber plunger, searches the surface until it finds the exact spot that will make the best bond. The foot then cleans the glue point. Next, the foot presses to the surface and, as the plunger-shaped foot flattens, water is pumped out. The mussel then lifts the center of its "plunger" and creates a small vacuum. Now the ingredients for its adhesive are pumped down through the foot and into the vacuum. This material creates a foamy foundation for the individual glue threads.

The glue itself is made of several proteins. They are mixed in various ratios to provide just the right amount of strength, flexibility and resistance to compression needed for each unique anchoring spot. Some of these proteins are very unusual in structure. Scientists suspect that they change their properties in response to changing conditions – what scientists call a "smart" material.

The mussel is not only a wonder of design, but a sophisticated chemist as well. Modern science is still trying to learn what the Creator has taught the mussel about glue.

Psalm 44:8

“In God we boast all the day long, and praise thy name for ever. Selah.”

Prayer: Dear Lord, when science tries to learn how the mussel makes its glue, it is recognizing that the creation has sophisticated designs in it. Even if it's unintentional, this is praise for You. I praise You, too. Amen.

Ref: Amato, Ivan. "Stuck on mussels." *Science News*, v. 139.