The seahorse has two tendons that allows it to lift its head and suck in prey at high speed

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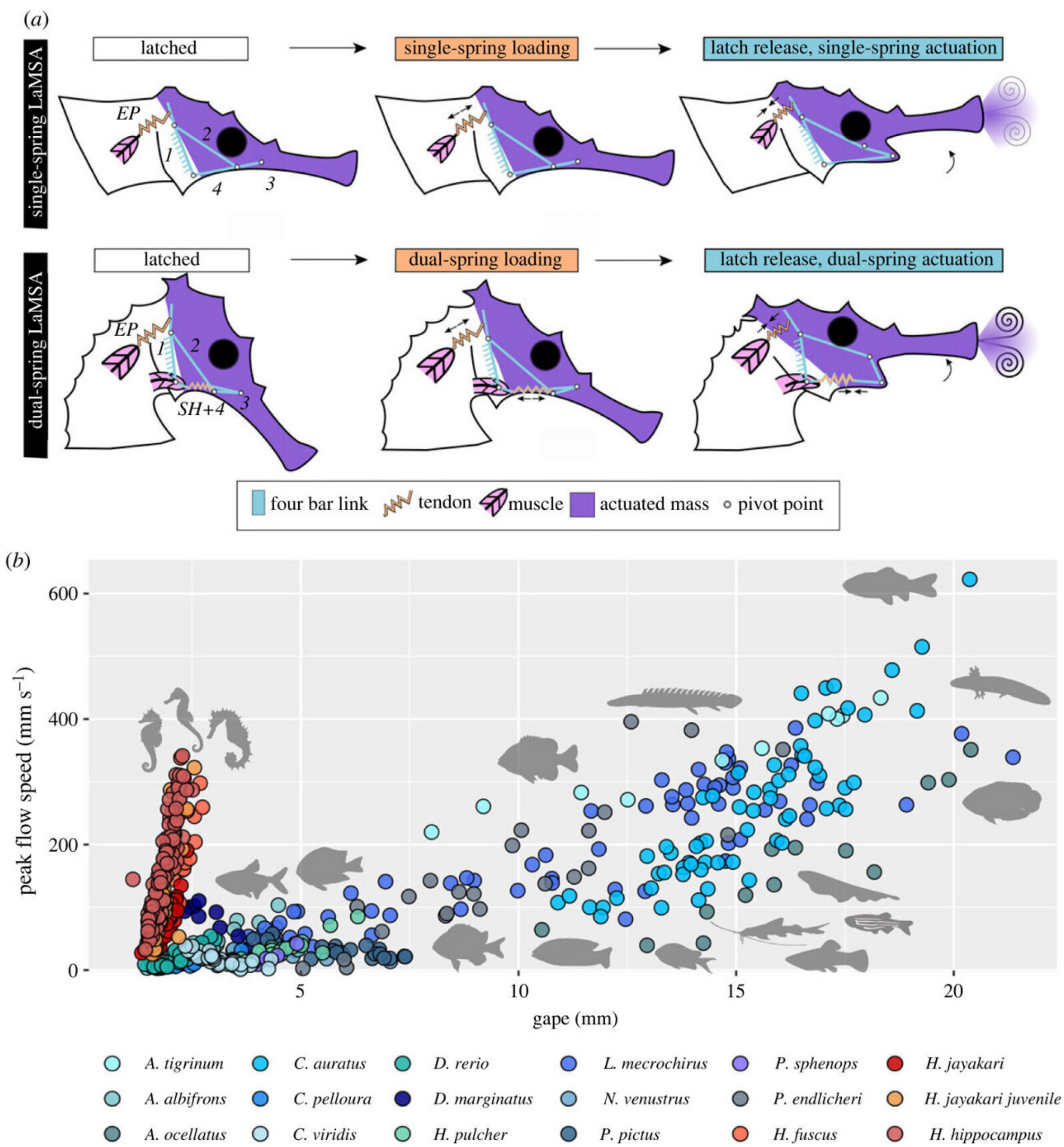

(a) Schematic illustrations of LaMSA systems in Syngnathiformes and the four-bar linkage system that transmits motion from the elastic tendons to lift the head and expand the buccal cavity. In single-LaMSA fishes such as the snipefishes (upper row), the epaxial tendons (EP) are the only elastic element that powers the system [14]. Power is transmitted through a rigid four-bar linkage to lift the head and depress the hyoid, thus powering both pivot feeding and probably suction feeding [14]. In the locked configuration, the tendons are loaded, and the head cannot be raised. When the system is triggered and the hyoid rotates downwards, the tendons recoil, simultaneously pulling levers 2 and 3. In seahorses (lower row), the four-bar linkage is modified to include the sternohyoideus muscle-tendon complex, and we hypothesize that this complex can store elastic energy within the four-bar loop [15] and accelerate the suction flows. Indeed, flow visualization using particle imaging velocimetry indicated that seahorses generate suction flows that are eight times stronger than expected based on their size ((b), [16]). Notation of LaMSA components follows [3,17]. The epaxial and sternohyoideus tendons are noted as EP and SH, respectively. See the electronic supplementary material, methods section "Morphology' for details of the functional anatomy. Colors in (b) depict different species, with warm colors depicting species with an LaMSA system and cooler colors depicting species without this system. Silhouettes of the represented species are located at approximately peak flow speed positions (y-axis). Credit: *Proceedings of the Royal Society B: Biological Sciences* (2023). DOI: 10.1098/rspb.2023.0520

A trio of marine scientists from Brown University, the Inter-University of Marine Science and the Rochester Institute of Technology has found that the seahorse has two elastic tendons that allows it to lift its head and suck in prey at very high speed. In their study, reported in *Proceedings of the Royal Society B*, Corrine Avidan, Steven Day and Roi Holzman studied seahorses as they fed to learn more about how they are able to capture prey so quickly.

Prior research has shown that seahorses capture prey by lifting their heads quickly to catch their target off-guard, and then suck it in—all in one quick, smooth movement. Prior research has also shown that a seahorse has a tendon in its head that is used to lift the head. But the tendon, the researchers in this new effort noted, could not lift the head so quickly, nor could it help with sucking in and swallowing prey so fast. To find out how their hunting method really works, they took a closer look.

Noting that seahorses have translucent skin, the researches shined a bright light against the sides of multiple seahorse heads as they went about feeding on prey, typically plankton, larval fish, algae and occasionally, small crustaceans. They discovered that the seahorses actually had two tendons in their heads and that they worked together to both jerk the head up and to suck in water. The newly discovered tendon was located just below the chin.

The researchers found that the tendons, which were flexible, worked like springs—each was stretchable, allowing for the storage of energy. Then, when it was time to grab a bite to eat, both tendons release, and together they force the head up quickly and then force water and prey to be sucked in just as quickly. The researchers compared the process to a bow and arrow. Stretching a bowstring stores energy. Releasing that energy pushes the arrow forward at great speed.

More information: Corrine Avidan et al, A power amplification dyad in seahorses, *Proceedings of the Royal Society B: Biological Sciences* (2023). DOI: 10.1098/rspb.2023.0520