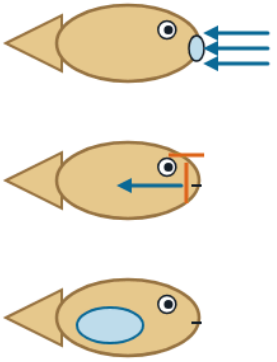
That is why

Why do pufferfish puff up?

They pump water into a pleated stomach until they are three or four times bigger: too big and spiky to swallow.

A The pump, one mouthful at a time



1. Mouth opens: water flows in

2. Mouth shuts and squeezes: water goes down

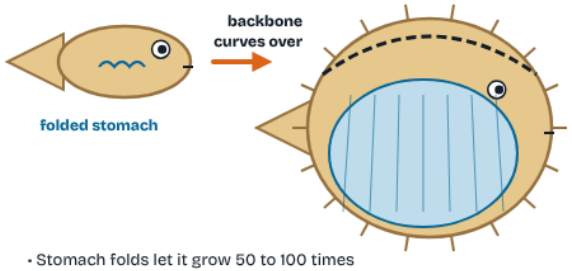
3. Into the stomach, then repeat

1 Breathing hard, not holding its breath

The black-saddled pufferfish kept its gills working while puffed: about 5 times its resting oxygen use. Its skin barely helped. After letting the water out, it took 5.6 hours on average to recover, paying off an energy debt built up by the escape and the pumping.

B Built to stretch

Before and after (side view, cutaway)



- Stomach folds let it grow 50 to 100 times
- Its lining (peritoneum) is pleated too
- No ribs and no pelvis to get in the way
- Spines stand up and reinforce the skin
- Back fin and tail fin end up tucked in

Body size: usual vs puffed



The stomach makes no acid and lost a sphincter.

C Built from a cough

Coughing
in virtually all fishes: water blasted out

Blowing
triggerfish, ocean sunfish: jets to uncover prey

Puffing
pufferfish: mouth shut, water pumped inward

Same muscles, broadly the same pattern: only the direction flips. A few filefish evolved a weaker puff on their own (convergence).

Backup defense: tetrodotoxin, over 1,000 times stronger than cyanide, made by bacteria in the food.

Like a car airbag: a folded bag becomes a shield too big to bite, but every refill costs hours of recovery.

Free for learning thatiswhy.com

Free for learning, teaching and research. Please credit: That Is Why, thatiswhy.com

Diagram: https://thatiswhy.com/diagrams/why-pufferfish-puff-up/ · Full guide: /why-do-pufferfish-puff-up/