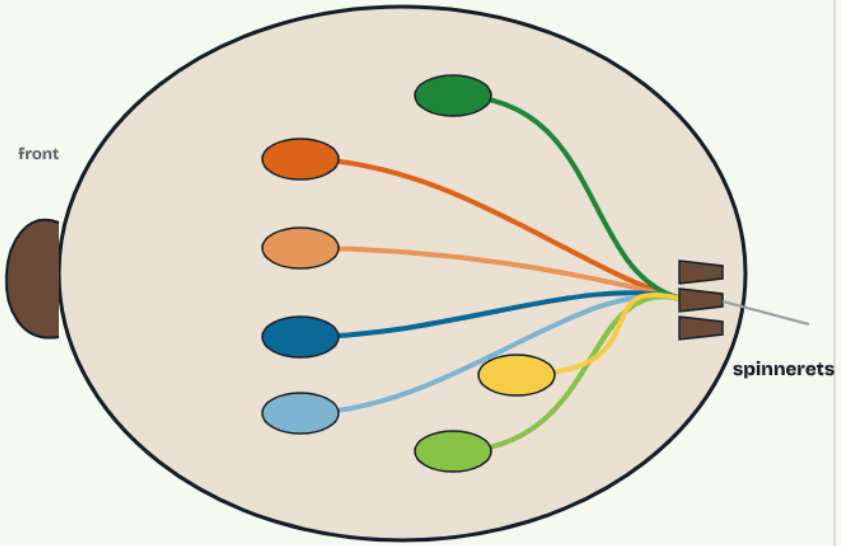
That is why

How do spiders make silk?

Liquid protein from silk glands is stretched, acidified and dried as it flows to the spinnerets, and leaves as a solid thread.

A Silk glands and spinnerets

Each gland makes a different silk for a different job.



- **Major ampullate**: dragline, web frame, lifeline
- **Minor ampullate**: temporary scaffolding
- **Flagelliform**: stretchy capture spiral
- **Aggregate**: sticky glue droplets
- **Tubuliform**: egg sac
- **Aciniform**: wrapping prey
- **Piriform**: attachment discs

B From liquid to thread

1. **Stored as a liquid**
   A thick protein "dope", about 30% protein, waits in the gland.
2. **Stretched in a narrowing duct**
   The tapering tube pulls the long proteins into line, like combing hair.
3. **Acid and drying**
   The duct makes the dope more acidic and removes water, so the proteins lock together.
4. **Pulled out as a solid thread**
   A valve and spigot set its thickness at the spinneret.

C Why it is so strong

1. **Strong for its weight**
   Weight for weight, dragline silk is about 5 times as strong as steel.
2. **Very tough**
   Darwin's bark spider silk soaks up over 10 times more energy than Kevlar before breaking.
3. **Stretchy**
   Some silks stretch to many times their length without snapping.

Made at body temperature, from water.

A spider spins steel-strength thread from water-based protein.

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