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Why Do We Get Goosebumps?

1. The mechanism

Each hair grows from a **hair follicle**. A tiny smooth muscle, the **arrector pili**, joins the follicle to the upper skin. Cold or a strong emotion (fear, a thrilling song) fires **sympathetic nerves** and releases **adrenaline**; the muscle contracts involuntarily, pulls the slanted follicle upright, the hair stands and the skin around it bunches into a bump: a **goosebump**.

2. Why animals have it

Effect	Benefit
Raised fur traps a thicker layer of air	Insulation from cold
Fur fluffs out (cat, porcupine quills)	Looks bigger to a threat

3. Why humans

Our body hair is too sparse to trap much air, so the reflex is largely a leftover from furry ancestors. Research (Shwartz et al., Cell, 2020) found the same nerve-muscle pair also helps hair-follicle stem cells grow new hair in long cold.

Key takeaways

- Arrector pili + sympathetic nerves + adrenaline = goosebumps.
- Involuntary reflex to cold and emotion.
- Useful for furry animals, mostly a leftover for us.

Practice questions

1. (MCQ) The muscle that raises hair is the (a) biceps (b) arrector pili (c) diaphragm (d) cardiac muscle
2. (Very short) Is the arrector pili voluntary or involuntary?
3. (Short) Explain how a goosebump forms.
4. (Short) How does raised fur help an animal in the cold?
5. (Application) Why do goosebumps barely warm humans?

Answer key

1. (b).
2. Involuntary (smooth muscle).
3. Cold/fear → sympathetic nerves and adrenaline → arrector pili contracts → hair stands, skin bunches into a bump.
4. Raised fur traps a thicker layer of insulating air.
5. We have too little body hair to trap much air.

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