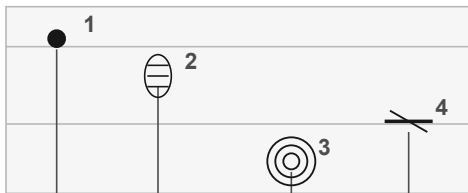


1. Detect a pattern



Conceptual skin layers

Held stimulus



Conceptual responses; not measured.

Dougherty, 2020; Paré et al., 2003

1. Merkel / SA-I

Held indentation and fine detail

2. Meissner / RA-I

Changing contact and flutter

3. Pacinian / RA-II

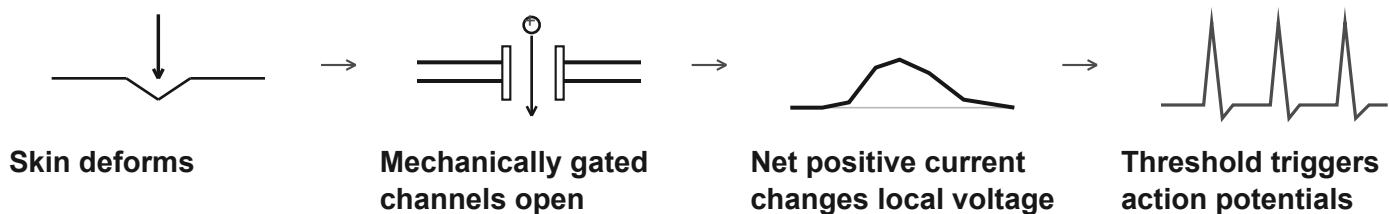
High-frequency vibration

4. Ruffini / SA-II

Skin stretch; traditional anatomical pairing

Four classic tactile afferent types in hairless skin. Slowly adapting responses can continue during a held stimulus. Rapidly adapting responses emphasize change.

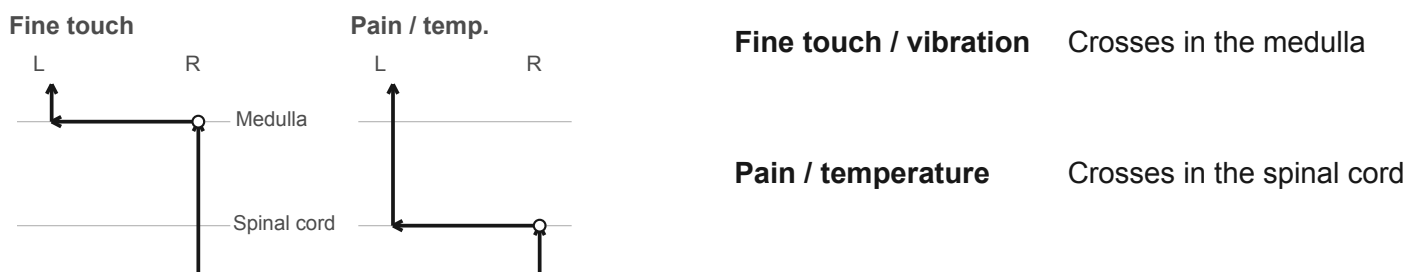
2. Convert force into a signal



PIEZO2 is a major touch channel. A graded local voltage change can start all-or-none traveling spikes.

Dougherty, 2020; Chesler et al., 2016

3. Follow the main routes



L / R = body sides; both ascend toward thalamus

These are two major pathways from the body. They relay toward the thalamus and sensory cortex.

Dougherty, 2026

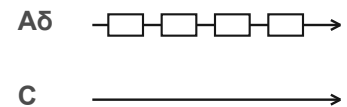
Stimulus → transduction → neural pathways → sensation and experience. Signals can change along the way.



4. Compare temperature and pain

TRPM8	Cold and menthol
TRPV1	Noxious heat and capsaicin
Aδ nociceptors	Thinly myelinated; typically faster, sharper
C nociceptors	Unmyelinated; typically slower, burning or aching

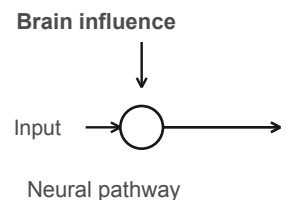
Warmth depends on activity across neurons. Nociception processes potentially harmful stimulation. Pain is the personal experience.



McKemy et al., 2002; Caterina et al., 1997; Paricio-Montesinos et al., 2020; Dubin & Patapoutian, 2010; IASP, 2020

5. Notice what can change

Gate control	Touch input can recruit inhibitory spinal circuits.
Endorphins	Opioid receptor signaling can reduce transmitter release and excitability.
Descending control	Brain signals can inhibit or facilitate transmission.
Phantom sensation	A sensation can be located in an absent limb.



Phantom sensations may be painless. Phantom pain is felt in the absent limb; residual-limb pain is in remaining tissue. Peripheral, spinal, and brain processes can interact.

Mendell, 2014; Che & Roth, 2023; Heinricher et al., 2009; Hanyu-Deutmeyer et al., 2023

6. Try tap, hold, glide



Tap your opposite palm gently



Hold comfortable contact for 20 seconds



Glide a fingertip a short distance

Notice contact starting, maintained pressure, and movement. Observe instead if you prefer. Use light contact on intact skin. This does not test individual receptors.

Which felt most obviously changing? Could you still sense the held contact?

Dougherty, 2020

Stimulus → transduction → neural pathways → sensation and experience. Signals can change along the way.

