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### **What good are fingerprints?**

While fingerprints usually enter our awareness as elements in some real or fictional crime story, it seems clear that they did not evolve to serve as little ID cards. What, if anything, are they for? One classic hypothesis is that they improve your grip. In a recent article, Scheibert, et al. explore evidence for a theory that might be more interesting to readers of AP&P. Fingerprint ridges may be part of the transduction mechanism that turns fine surface texture into a signal in the nervous system.

Static texture is not much of a stimulus, at least not when the texture elements are small. Texture must be turned into vibration by moving the detector (e.g. the fingers) relative to the surface. The vibrations are picked up by Pacinian fibers that behave as band-pass filters with an optimal frequency around 250 Hz. You can't record from human fingertips in behaving humans so Scheibert, et al. built a fingertip and looked at its responses with and without fingerprint ridges. Without fingerprints, the fingertip does not respond well to features smaller than about 1 mm. The fingerprint ridges, however, create little vibrations in the skin as each ridge moves over each little feature in the surface. Under normal circumstances, people move their fingers at a rate of 10-15 cm/s. At this speed, the fingerprints generate a signal in the 250Hz range that the Pacinian fibers want to see.

Of course, this won't work if you run your finger over the surface in a direction parallel to the ridges. However, since your fingerprint is an elliptical swirl of ridges, there are always ridges orthogonal to the direction of motion. This raises the possibility, still to be tested, that the underlying sensors might be orientationally tuned, giving still more richness to the sensory possibilities of the fingertip.