

What Are

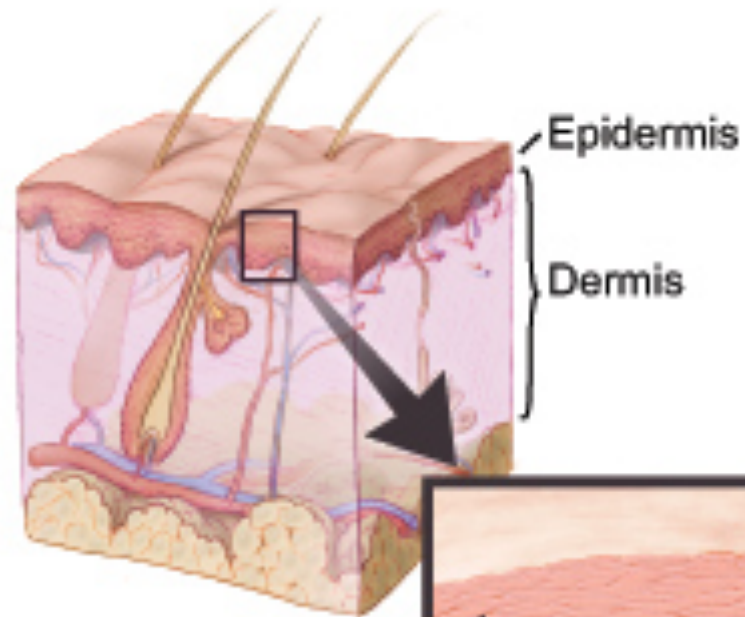
Fingerprints?

- All fingers, toes, feet, and palms are covered in small ridges.
- These ridges are arranged in connected units called *dermal*, or **FRICTION**, *ridges*.
- These ridges help us get or keep our **GRIP** on objects.
- Natural **SECRETIONS** plus dirt on these surfaces leave behind an impression (a print) on those objects with which we come in contact.

Formation of Fingerprints

- An animal's external tissue (skin) consists of
 - (a) an inner dermis and
 - (b) an outer epidermis.
- The creation of fingerprints occurs in a special layer (the **BASAL** layer) in the epidermis where new skin cells are produced.

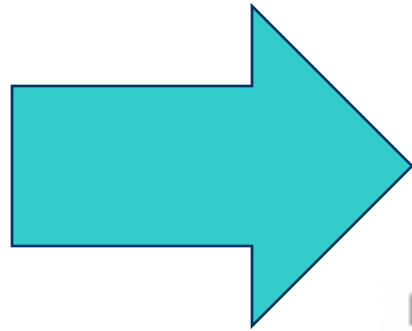
Skin Anatomy



Squamous cells

Epidermis

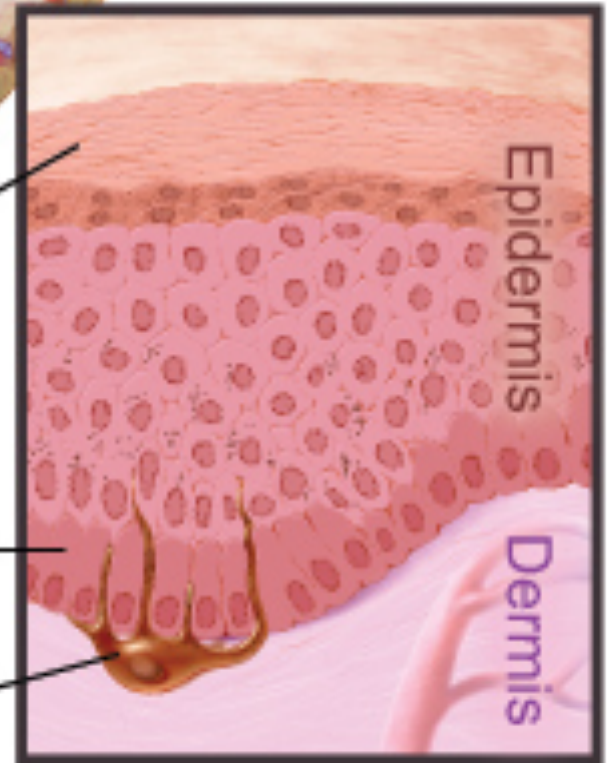
Lower level of the epidermis



Basal cells

Melanocyte

Dermis



Formation of Fingerprints

- Fingerprints begin forming approximately at the start of the 10th week of pregnancy.
- It is believed that no two mammals have the same fingerprints because everyone's **GROWTH RATE** in-utero is different
- Because the basal layer grows faster than the others, it **COLLAPSES**, forming intricate shapes.

Principles of Fingerprints

First Principle: A fingerprint is an individual characteristic; no two fingers have yet been found to possess identical ridge characteristics.

Principles of Fingerprints

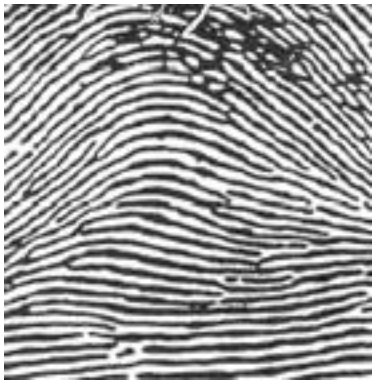
Second Principle: A fingerprint will remain unchanged during an individual's lifetime.

Principles of Fingerprints

Third Principle: Fingerprints have general ridge patterns that permit them to be systematically classified.

Characteristics of Fingerprints

- There are 3 general fingerprint distinctions:



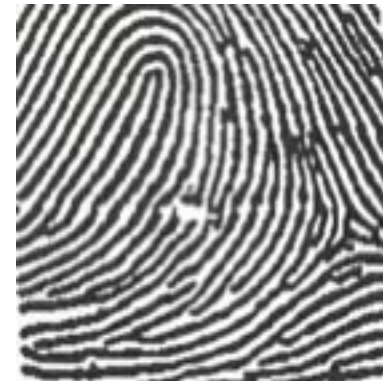
ARCH

About 5%
of the population



WHORL

About 30%

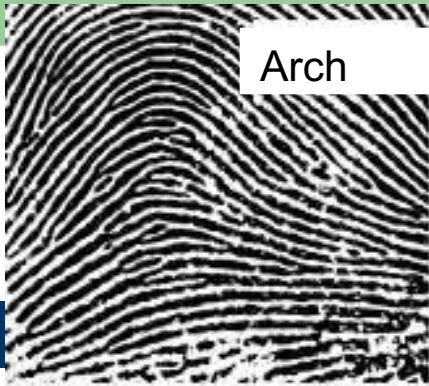


LOOP

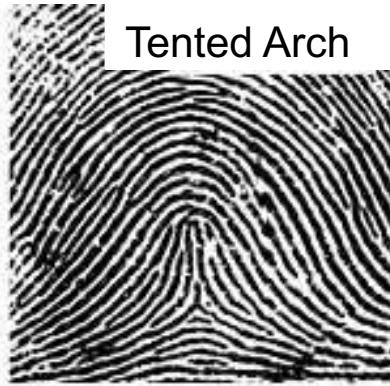
About 65%

Characteristics of Fingerprints

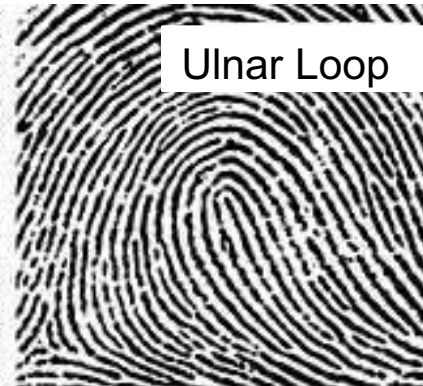
- Basic patterns can be further divided:
 - Arch patterns can be plain (4%) or tented (1%).
 - Loop patterns can be radial or ulnar
 - Whorl patterns can be central pocket (2%), double loop (4%), or accidental (0.01%).
- Even twins have unique fingerprints due to small differences (called *minutiae*) in the ridge patterns.



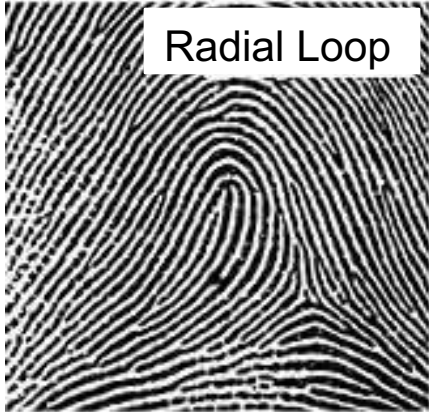
Arch



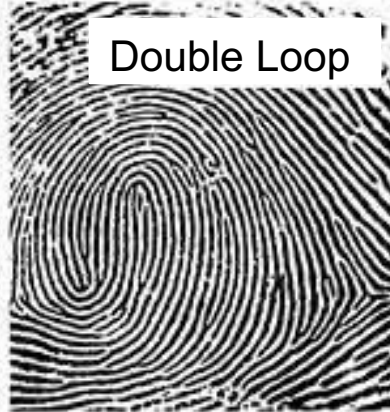
Tented Arch



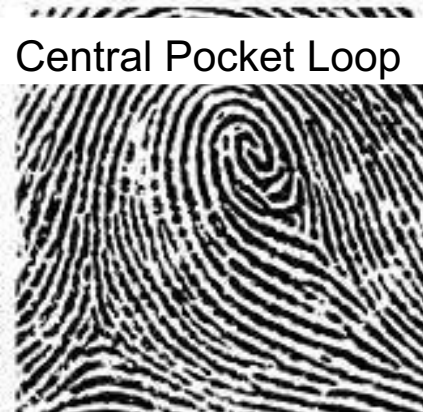
Ulnar Loop



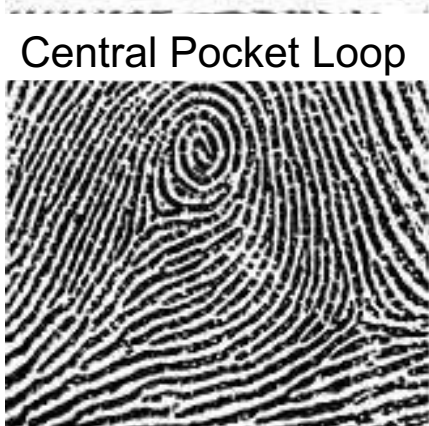
Radial Loop



Double Loop



Central Pocket Loop



Central Pocket Loop



Whorl



Accidental