Exercise 9
Skin (Integument)

Objectives

After completing this laboratory exercise you should be able to:

- Identify – the microscopically visible features of skin, specifically its layers and their components
- Identify – the accessory skin structures such as sweat glands, sebaceous glands, arrector pili muscles, and hair follicles
- Identify – peripheral nervous systems in the skin

Introduction

One of the most difficult bits of mental gymnastics you will ever do is the visualization and reconstruction of 3-dimensional objects from 2-dimensional microscope slides. In working with the skin, you must do this for the skin itself, and for the accessory structures present in it. Structures, such as glands and hair follicles look different at different levels, and two adjacent structures may well be sectioned at different levels in the same slide.

The integument of mammals consists of the skin proper, and also the various accessory structures. These are things like hair, glands and nails, all of these are ultimately derived from the skin and are, in fact, part of it.

Skin

Skin consists of two distinct regions, the epidermis and the dermis. The epidermis is the superficial non-vascular layer that contains keratinized, stratified squamous epithelium. The dermis is situated directly inferior to the epidermis. This skin layer is deeper, thicker and vascular. The superficial layer of the dermis interdigitates with the epidermis and forms indentations called dermal papillae. This papillary layer contains loose irregular CT. The deeper layer of the dermis is dense connective tissue. Sensory receptors are present in the dermis, Meissner’s corpuscles closer to the surface and Pacinian corpuscles deeper in the CT of the dermis.

The skin histology is basically similar in different regions of the body, the thickness varies. Palms and soles are constantly exposed to increased wear, tear and abrasion. As a result, the epidermis in these regions of the body is thick, especially the outermost stratified keratinized layer. These regions of the body have thick skin. The thick skin contains numerous sweat glands but lack hair, follicles, sebaceous glands and arrector pili muscles. The remaining of the body surfaces is covered by thin skin.

The slides you will be looking at represent a cross-section of different types of skin and its accessory structures. The following is a list of structures you should be able to identify in different types of skin.

Thin skin

Epidermis – superficial layer
- Stratum basale – single layer of low columnar cells at base of epidermis
- Stratum spinosum – few rows of polygonal shaped cells directly over the stratum basale
- Stratum corneum – most superficial layer – keratinized

Epidermal cells
- Keratinocytes – most common (epithelial cells)
- Melanocytes – present in basal layer (contain melanin)

Dermis – lies beneath the epidermis – abundant collagen, elastic and reticular fibers
- Papillary layer – interdigitates with epidermis
- Reticular layer – most of the dermis
Accessory structures – most located in the dermis
  Hair follicles – numerous in scalp sections
  Arrector pili muscles – bundles of smooth muscle extending obliquely from the follicle to the papillary dermis.
  Sweat glands – coiled gland with a duct, it will be cut at different levels
  Sebaceous glands – flask shaped, packed with cells. Foamy appearance (look for them close to hair follicles)

Thick skin

Notice the width of the stratum corneum.
The dermal papillae are prominent in thick skin.
In slides of palmar skin, look for Meissner’s corpuscles in the dermal papillae and Pacinian corpuscles in the deeper layers of the dermis.

Scalp

Notice the subcutaneous layer (hypodermis) and the presence there of adipose tissue.
Hair follicles – these are numerous, closely packed and placed at an angle with the surface of the skin. Hair follicles sectioned at different angles are visible.
Highly vascular.
Look for Pacinian corpuscles (look like cross sections of onions)

Palate

Hard palate – bony shelf covered by stratified squamous keratinized epithelium, CT with adipose cells and acini of minor salivary glands.
Soft palate – covered by stratified squamous non-keratinized epithelium and a subjacent, dense irregular, collagenous CT housing minor salivary glands.

List of slides - Skin

I-1  Scalp, human
I-2  Scalp, human, caucasian
I-3  Scalp, human, black
I-4  Skin, human, pigmented
I-5  Prepuce, horse
I-6  Skin, human, triple stain
I-7  Foot pad, mammal
I-8  Finger tip and nail
I-9  Skin, palmar, monkey, t.s.
I-10  Skin, plantar, monkey, t.s.
I-11  Skin, palm, human, t.s.
I-12  Keratinization
I-13  Skin (Meissner’s corpuscles)
I-14  Hair follicles
I-15  Hair, fetus
I-16  Scalp, horizontal section
I-17  Lip, fetus
I-18  Lip, adult
I-19  Hard palate
I-20  Hard and soft palate
I-21  Eyelid, mammal
I-22  Palmar, human, silver

REVIEW BOX SLIDES 11, 16, 90, 91
Pathology of the Skin

I-22  Scar
I-23  Tattoo
I-24  Psoriasis
I-25  Kaposi's sarcomas, skin
I-26  Solar damage
I-27  Frostbite
I-28  Ossification, skin
I-29  Verruca plantaris (plantar wart)
I-30  Malignant melanoma

Comparative Section

Notice the differences in the skin of different groups of vertebrates

I-31  Frog
I-32  Amphiuma
I-33  Bufo
I-34  Reptile
I-35  Salvelinus
I-36  Turtle
I-37  Snake
I-38  Fish
I-39  Perch
I-40  Dogfish
I-41  Shark
I-42  Bird
I-43  Pigeon
I-44  Skin review
I-45  Chromatophores