FETAL PIG HISTOLOGY

Adipose

A form of loose connective tissue comprised of fat storing adipocyte cells. The cells contain a large fat droplet, which forces the nucleus to be squeezed into a thin rim at the edge of the cell.
Areolar connective tissue is a loose configuration of cells suspended in a matrix of collagen, elastic, and reticular fibers. There are a variety of cells that populate this kind of tissue including fibroblasts, macrophages, and mast cells.
Artery walls contain a single layer of squamous epithelial cells (aka endothelium) surrounded by several layers connective tissue (collagen) and smooth muscle, which contract to move blood through the artery. In cross section, arteries appear circular.
Blood is the only liquid tissue found in the human body and has many diverse functions... Blood cells are produced from hematopoetic stem cells found in bone marrow, which can generate several specialized cell types including: red blood cells (erythrocytes), white blood cells (leucocytes) and cellular fragments known as platelets (formed elements). Red blood cells are full of the protein hemoglobin, which binds to and transports oxygen throughout the body. In humans red blood cells do NOT have a nucleus. There are dozens of white blood cell lineages; each plays a discrete role in the
immune system by recognizing, destroying and remembering foreign particles/pathogens. Platelets are involved in blood clotting and wound repair.

Bone

The endoskeleton of vertebrates is comprised of bone, which is a largely calciferous form of connective tissue that is both rigid and elastic. The endoskeleton provides structural support and protection of internal organs, as well as, playing an integral role in bodily movement. While the outer layer of a bone is very hard due to mineral deposits, the inner part of the bone is spongy in appearance and contains bone marrow. Bone is the only form of connective tissue that is comprised of a solid matrix. Bone producing cells (osteoblasts) secrete the extracellular matrix and become encased in small hollow areas called lacunae. In compact ground bone the lacunae appear as elongated black spots in
the bone matrix. Small extensions from osteocytes (bone degrading cells) called canaliculi, radiate from the lacunae into the surrounding bone matrix to send and receive signals by diffusion.

**Cardiac Muscle**

The heart is made up of cardiac muscle fibers. This tissue appears highly branched and contains small cells with a single nucleus. Cardiac tissue has a striated appearance, and has visible intercalated disks at the junction between cells. Contraction of cardiac muscle is involuntary.
To prevent closing of the windpipe during movement of the neck, the trachea is lined with rings of hyaline cartilage, which holds the windpipe open at all times.
Large Intestines

The inner mucosal layer of the large intestine does NOT contain villi as seen in the small intestine, but instead are lined with absorptive columnar epithelial cells and goblet cells that secrete mucous to aid the passage of waste materials out of the body. Like the small intestine, there are underlying rings of smooth muscle cells along the large intestine that...
contract to move indigestible matter towards the rectum (last few inches of the GI tract) and out the anus.

Liver

At the tissue level, the liver is made up of sesame seed-sized lobules that are separated by sinuosoids (“leaky capillaries”) which contain cells that destroy bacteria and worn-out blood cells. Sinuosoids are also the major site of fluid and nutrient filtration from blood leaving the GI tract. Each lobule is comprised of hepatocytes surrounding a central vein. One function of hepatocytes is to secrete bile, which aids in the digestion of lipids (fats) in the duodenum.
The diaphragm and intercostals are comprised of skeletal muscle tissue. Lung alveoli are composed of a single layer of the squamous epithelium. A thin layer of connective tissue and numerous blood vessels capillaries are found between the alveoli. Arteries and veins are also lined with simple squamous epithelium. In contrast, the two bronchi which branch off the trachea and enter the lungs are line with ciliated columnar epithelium. As
each bronchus progresses deeper into the lungs, it branches into smaller bronchiole tubules, which are lined with cuboidal epithelium.

**Multipolar Neurons**
Ovary and Oocyte

The ovary consists of a thin capsule of fibrous connective tissue covered by a single layer of cuboidal epithelium. The region known as the cortex consists of a cellular connective tissue stroma in which the ovarian follicles are embedded. These follicles hold a single oocyte during the maturation process. The outer medulla region of the ovary contains loose connective tissue, blood vessels and nerves.
At the cellular level the pancreas contains clusters of enzyme secreting epithelial cells called acinar cells. Collectively, these cells form the tissue that makes up the multiple lobes of the pancreas. These acini surround ducts which collect digestive enzymes and funnel them to the duodenum region of the small intestines. Specialized groups of cells, known as the Islets of Langerhans, are comprised of cells that produce the hormones insulin and glucagons which regulate glucose metabolism (“blood sugar”).
Red Blood Cells (see Arteries and Blood above)

Skin
The inner surface of the small intestine is covered with small finger like projections called villi that are covered in simple columnar epithelium (absorptive cells) and blood vessels. Note that the villi (shown in the 200X slide) are lined with columnar epithelial cells which have basally located nuclei. Underlying the absorptive surfaces of the intestine lie circular segments of smooth muscle, whose contractions aid the movement (and digestion) of food through the intestines.
Stomach

- Simple columnar epithelium lines the gastric pits
- STOMACH (Fundic)
- Loose aerolar connective tissue
- Gastric glands
- Blood vessel
- Thin muscle layer (muscularis)
- Gastric glands
At the cellular level, the stomach walls are comprised of multiple tissue types. The outermost layer is composed of a protective layer of squamous epithelial cells. The middle layer is composed of smooth muscle tissue that contracts during digestion. The innermost layer contains millions of gastric pits which are the openings to underlying gastric glands which secrete gastric juices (digestive enzymes) and are surrounded by parietal cells which secrete stomach acid. Notice that the gastric pits are lined with tightly packed simple columnar epithelial cells.
The tongue consists of a large grouping of skeletal muscle fibers encased in layers of connective tissue and an outer layer of stratified squamous epithelium. Embedded in the epithelial layer are short, flat projections called papilla, and various taste buds.
Smooth muscle is an involuntary form of muscle that is comprised of non-striated muscle cells. Smooth muscle is responsible for the contraction of hollow organs such as the bladder, uterus, intestines, and blood vessels. Smooth muscle cells have a spindle like shape and contain a single nucleus.
The testes consist of a thick capsule of connective tissue surrounded by a serosa. Each testis is subdivided into multiple obules containing seminiferous tubules. Between the convoluted seminiferous tubules is continuous with a layer of loose vascular connective tissue. Embedded in the epithelium of the seminiferous tubules are spermatagonia and developing spermatocytes (immature sperm).
Several types of blood cells are found within the thymus including macrophages and lymphocytes, which are loosely attached to a network of epithelial reticular cells which are thought to secrete thymic hormones.
The thyroid gland is composed of follicles, which are lined by a single layer of epithelial cells. Each thyroid follicle contains a central colloid (pale pink region) surrounded by a layer of follicle cells, which produce thyroid hormone.
Trachea

- pseudostratified columnar epithelium
- chondrocytes
- matrix
- hyaline cartilage

- pseudostratified columnar epithelium
- hyaline cartilage
The inner trachea is lined with pseudostratified columnar epithelial cells which are covered in hair-like cilia which help move mucus up and out of the lungs. Underlying the epithelial layers are regions of elastic connective tissues and smooth muscle. To prevent closing of the windpipe during movement of the neck, the trachea is lined with rings of hyaline cartilage which holds the windpipe open at all times.

Vein

Like arteries vein walls contain a single layer of squamous epithelial cells (aka endothelium), unlike arteries, they have a greatly reduced amount of surrounding smooth muscle tissue. In cross section, veins have a somewhat collapsed, oblong shape.