

▲ **Figure 41.14 Absorption of fats.** Because fats are insoluble in water, adaptations are needed to digest and absorb them. Bile salts (not shown) break up large fat droplets and maintain a small droplet size in the intestinal lumen, exposing more of the fat at the surface to enzymatic hydrolysis. The fatty acids and monoglycerides released by hydrolysis can diffuse into epithelial cells, where fats are reassembled and incorporated into water-soluble chylomicrons that enter the lymphatic system.

and proteins, forming globules called **chylomicrons**. Being water soluble, chylomicrons can dissolve in the blood and travel via the circulatory system.

Before reaching the bloodstream, chylomicrons are first transported from an epithelial cell in the intestine into a **lacteal**, a vessel at the core of each villus (see Figures 41.13 and 41.14). Lacteals are part of the vertebrate lymphatic system, which is a network of vessels filled with a clear fluid called lymph. Starting at the lacteals, lymph containing the chylomicrons passes into the larger vessels of the lymphatic system and eventually into large veins that return the blood to the heart.

In addition to absorbing nutrients, the small intestine has an important function in the recovery of water and ions. Each day we consume about 2 L of water and secrete another 7 L in digestive juices. Typically all but 0.1 L of the water is reabsorbed in the intestines, with most of the

recovery occurring in the small intestine. There is no mechanism for active transport of water. Instead, water is reabsorbed by osmosis when sodium and other ions are pumped out of the lumen of the intestine.

Processing in the Large Intestine

The alimentary canal ends with the **large intestine**, which includes the colon, cecum, and rectum. The small intestine connects to the large intestine at a T-shaped junction

(**Figure 41.15**). One arm of the T is the 1.5-m-long **colon**, which leads to the rectum and anus. The other arm is a pouch called the **cecum**. The cecum is important for fermenting ingested material, especially in animals that eat large amounts of plant material.

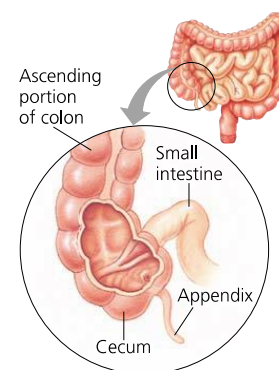
Compared with many other mammals, humans have a small cecum. The **appendix**, a finger-like extension of the human cecum, has a minor and dispensable role in immunity.

The colon completes the reabsorption of water that began in the small intestine. What remain are the **feces**, the wastes of the digestive system, which become increasingly solid as they are moved along the colon by peristalsis. It takes approximately 12–24 hours for material to travel the length of the colon. If the lining of the colon is irritated—by a viral or bacterial infection, for instance—less water than normal may be reabsorbed, resulting in diarrhea. The opposite problem, constipation, occurs when the feces move along the colon too slowly. Too much water is reabsorbed, and the feces become compacted.

The undigested material in feces includes cellulose fiber. Although it provides no caloric value (energy) to humans, fiber helps move food along the alimentary canal.

A rich community of mostly harmless bacteria lives on the unabsorbed organic material in the human colon, contributing approximately one-third of the dry weight of feces. As by-products of their metabolism, many colon bacteria generate gases, including methane and hydrogen sulfide, the latter of which has an offensive odor. These gases and ingested air are expelled through the anus.

The terminal portion of the large intestine is the **rectum**, where the feces are stored until they can be eliminated. Between the rectum and the anus are two sphincters, the inner one being involuntary and the outer one being voluntary. Periodically, strong contractions of the colon create an urge



▲ **Figure 41.15 Junction of the small and large intestines.**



시료 준비



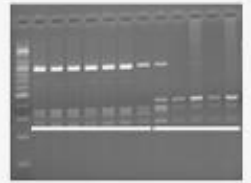
gDNA 추출



PCR mix에
DNA 첨가



PCR 수행



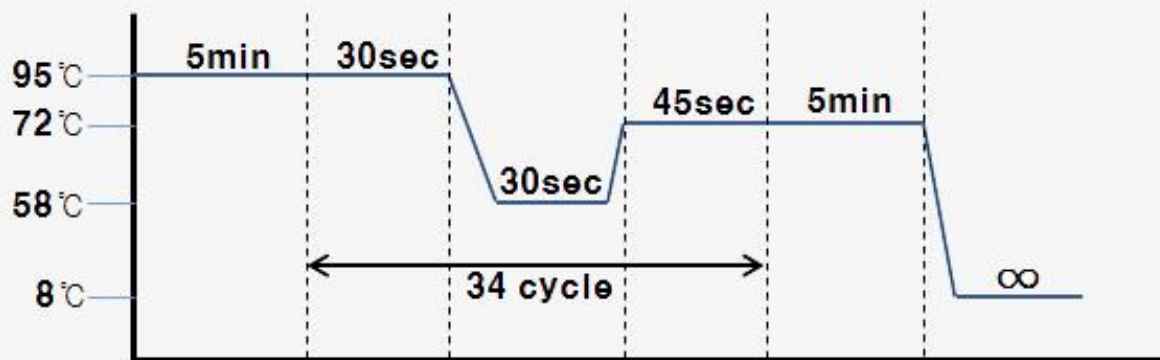
전기영동 및
결과 해석

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- ① 약 1시간 30분 소요
② 약 30분 소요

약 2시간 소요

약 30분 소요

PCR 조건



Lipoproteins- Structure, classification, metabolism and significance

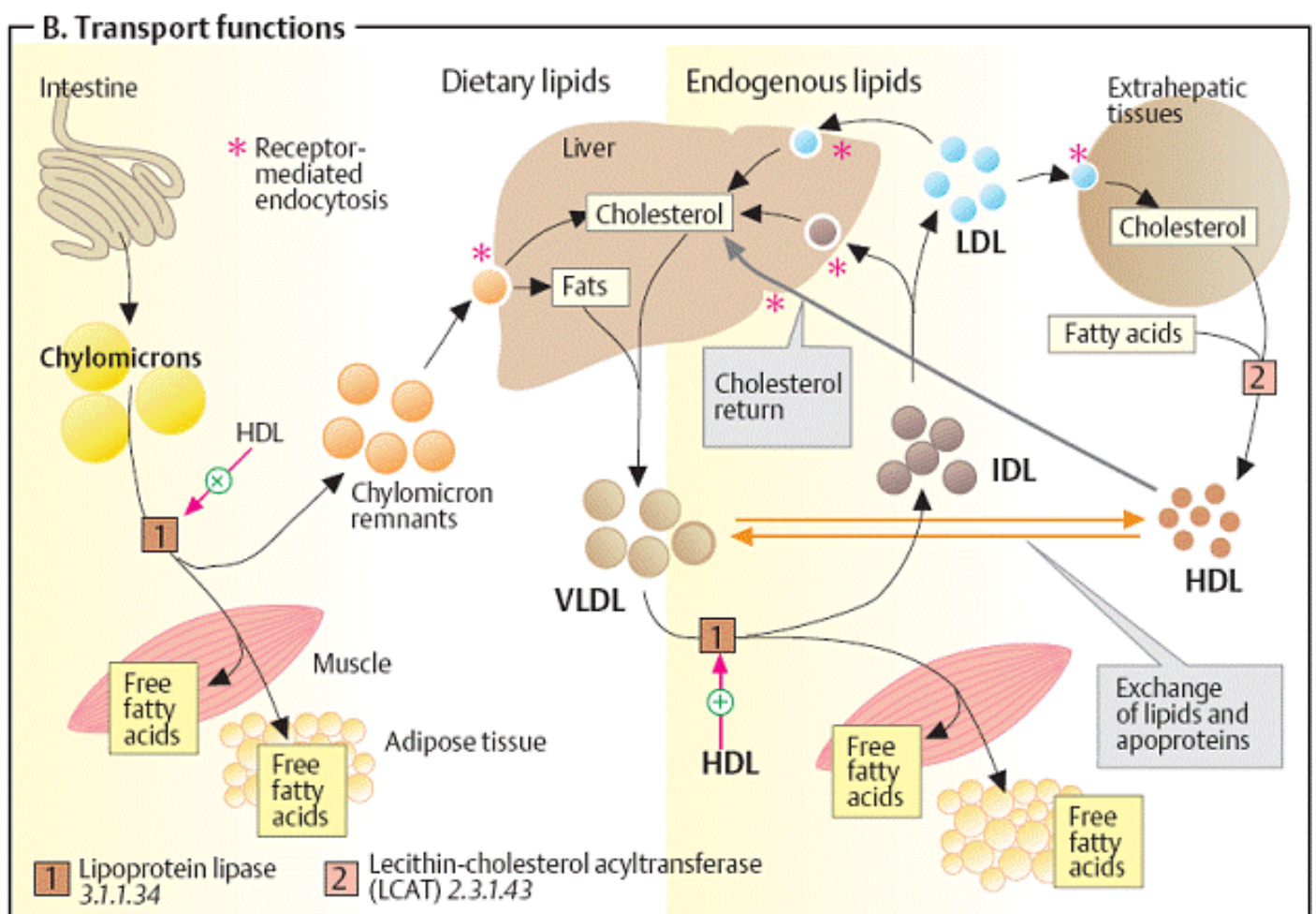
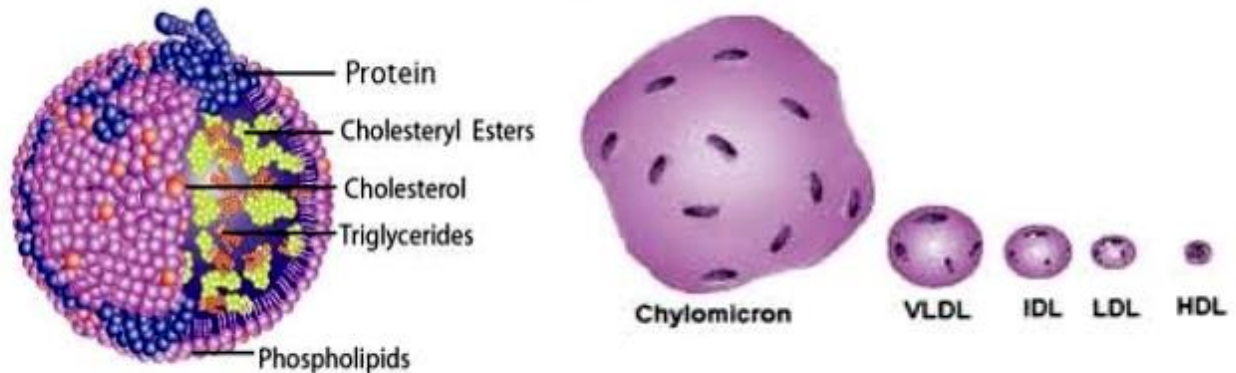
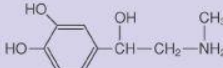
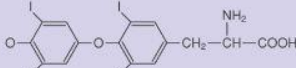
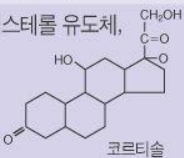


표 18-2 호르몬의 화학적 분류

아민류				
특성	펩티드	카테콜아민	갑상선 호르몬	스테로이드류
구조	<p>특정 아미노산의 고리</p> $\begin{array}{c} \text{Cys}^1 - \text{s} - \text{s} - \text{Cys}^6 - \text{Pro}^7 - \text{Arg}^8 - \text{Gly}^9\text{NH}_2 \\ \qquad \qquad \qquad \\ \text{Tyr}^2 \qquad \qquad \text{Asn}^5 \\ \qquad \qquad \qquad \\ \text{Phe}^3 \qquad \qquad \text{Gln}^4 \end{array}$ <p>비소프레신</p>	<p>티로신 유도체,</p>  <p>에피네프린</p>	<p>요오드화 티로신 유도체,</p>  <p>타이록신, T₄</p>	<p>콜레스테롤 유도체,</p>  <p>코르티솔</p>
용해도	친수성(소수성)	친수성(소수성)	친유성(소수성)	친유성(소수성)
합성	조면 소포체에서, 골지체에서 포장	세포질	콜로이드상의 내륙의 세포 외 장소	여러 가지 세포 내 구획에서 콜레스테롤 분자의 단계적 변형
저장	다량이 분비 과립	크로마핀 과립	콜로이드상	저장되지 않음, 콜레스테롤 전구체가 지질 방울에 저장
분비	과립의 세포외유출	과립의 세포외유출	콜로이드의 세포내유입	단순 확산
혈중 수송	자유형 호르몬으로	반 정도가 혈장 단백질에 결합하여	대부분이 혈장 단백질에 결합하여	대부분이 혈장 단백질에 결합하여
수용체 장소	표적세포 표면	표적세포 표면	표적세포의 내부	표적세포의 내부
작용기전	채널 변화 또는 효과를 만들어내는 기존의 단백질의 활성을 변화시키는 2차 전령의 활성화	효과를 만들어내는 기존의 단백질의 활성을 변화시키는 2차 전령의 활성화	효과를 만들어내는 새로운 단백질을 만들기 위해 특정 유전자를 활성화시킴	효과를 만들어내는 새로운 단백질을 만들기 위해 특정 유전자를 활성화시킴
호르몬의 종류	시상하부, 뇌하수체 전엽, 뇌하수체 후엽, 송과선, 췌장, 부갑상선, 위장관, 신장, 간, 갑상선 C 세포, 흉선, 심장 등의 호르몬들	부신수질의 호르몬 한정	갑상선 소낭세포 호르몬 한정	부신피질과 생식선의 호르몬들 그리고 대부분의 태반 호르몬류 (비타민 D는 스테로이드와 유사)