

Local ophthalmic anesthetic agents are used for removing foreign objects. The blink reflex is impaired, so it is important to inform the patient to wear darkened glasses when going outside until the effect of the medication wears off.

Staining agents are nontoxic, water-soluble dyes used to diagnose corneal epithelial defects caused by infection or injury. They can also be used to find foreign bodies or contact lenses in the eye. The stain colors the object green.

### Miscellaneous Eye Medications

Immunomodulators such as Restasis work to treat a certain type of chronic dry eye by increasing tear production. The patient must understand that it will take time before the effects of this drug are felt and up to 6 months for maximum benefit. The liquid portion of the medication is castor oil, which provides some immediate moisturizing benefit. See Drug Spotlight 14.1 for a new medication (Xiidra) used to treat chronic dry eye.

Macular degeneration progression may be slowed with the use of ranibizumab (Lucentis) or aflibercept (Eylea). These medications are injected into the affected eye approximately once a month.

## THE EAR

To understand ear disorders, you must understand the anatomy of the ear, which is divided into the outer, middle, and inner ear (Fig. 14-2). The outer ear consists of the pinna, which is the visible part of the ear, and the external auditory canal. The pinna protects the middle and inner ear, and it also collects sound and funnels it through the external auditory canal. The external auditory canal contains glands that secrete **cerumen** (earwax). The purpose of this wax is to protect the inner ear from damage and infections. Thus, a lack of wax can lead to an increased risk for ear infections. Too much earwax can cause a blockage leading to loss of hearing.

The middle ear is separated from the outer ear by the tympanic membrane (eardrum), and it includes the auditory ossicles (malleus, incus, stapes), the middle ear cavity (hollow area containing ossicles), and the eustachian tube. Once sound waves hit the tympanic membrane, three flexible bones called the ossicles convert that sound into mechanical vibrations. The eustachian tube connects the ear and the throat and functions to equalize pressure on both sides of the tympanic membrane.

The inner ear includes the oval window, round window, cochlea, and semicircular canals. The oval window is located directly behind the stapes and vibrates when that bone strikes it. This sets in motion the fluid-filled tubes, which generate nerve impulses that travel to the brain. The round window serves

### Drug Spotlight 14-1 *Xiidra (lifitegrast ophthalmic)*

<b>Classification</b>	Artificial tears/Ocular lubricant
<b>Availability</b>	Ophthalmic solution
<b>Indications</b>	Used to treat symptoms of dry eye disease.
<b>Dosage/Implementation</b>	One drop in each eye every 12 hours.
<b>Adverse Reactions/ Side Effects</b>	Changes in vision, eye irritation or discomfort, blurred vision, redness of the white part of sclera.
<b>Contraindications/ Precautions</b>	No contraindications, use cautiously in elderly, pregnancy/lactation, and children younger than 17 years of age as there are insufficient studies at this time in these populations.