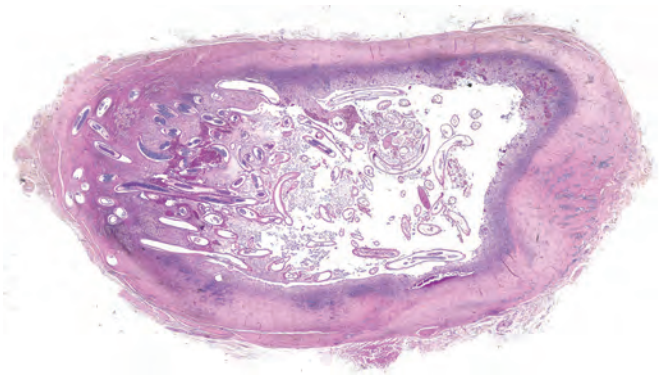

Figure 8-57 Microfilaria-laden gravid female of *Onchocerca volvulus* in a subcutaneous fibrous nodule.

Ivermectin kills only immature worms, not adult worms, so parasites repopulate the host a few months after treatment. Doxycycline treatment blocks reproduction of *O. volvus* for up to 24 months by killing *Wolbachia*, already mentioned as symbiotic bacteria that are required for the fertility of the filarial species.

MORPHOLOGY

Onchocerca volvulus causes chronic, itchy dermatitis with focal darkening or loss of pigment and scaling, referred to as *leopard, lizard, or elephant skin*. Foci of epidermal atrophy and elastic fiber breakdown may alternate with areas of hyperkeratosis, hyperpigmentation with pigment incontinence, dermal atrophy, and fibrosis. The subcutaneous onchocercoma is composed of a fibrous capsule surrounding adult worms and a mixed chronic inflammatory infiltrate that includes fibrin, neutrophils, eosinophils, lymphocytes, and giant cells (Fig. 8-57). The progressive eye lesions begin with punctate keratitis along with small, fluffy opacities of the cornea caused by degenerating microfilariae, which evoke an eosinophilic infiltrate. This is followed by a sclerosing keratitis that opacifies the cornea, beginning at the scleral limbus. Keratitis is sometimes accentuated by treatment with antifilarial drugs (Mazzotti reaction). Microfilariae in the anterior chamber cause iridocyclitis and glaucoma, whereas involvement of the choroid and retina results in atrophy and loss of vision.

Emerging Infectious Diseases

The rapidly expanding human population juxtaposed with environmental infractions allow the emergence of new pathogens and the re-emergence of old infectious agents. Although infectious diseases such as leprosy have been known since biblical times, and parasitic schistosomes and mycobacteria have been demonstrated in Egyptian mummies, a surprising number of new infectious agents continue to be discovered (Table 8-9). The infectious causes of some diseases with significant morbidity and mortality were previously unrecognized, because some of the infectious agents are difficult to culture; examples include *Helicobacter pylori* gastritis, HBV and HCV, and *Legionella pneumophila*. Some infectious agents are genuinely new to humans, e.g., HIV, which causes AIDS, and *B. burgdorferi*, which causes Lyme disease. Other infections have become much more common because of immunosuppression caused by AIDS or therapy for transplant rejection and some cancers (e.g., CMV, Kaposi sarcoma herpesvirus, *Mycobacterium avium-intracellulare, Pneumocystis jiroveci*, and *Cryptosporidium parvum*). Finally, infectious diseases that are common in one area may be introduced into a new area. For example, West Nile virus has been common in Europe, Asia, and Africa for years but was first described in the United States in 1999.

Human demographics and behavior are important contributors to the emergence of infectious diseases. AIDS was first recognized in the United States as predominantly a disease of homosexuals and injection drug users, but heterosexual transmission is now common. In sub-Saharan Africa, the area of the world with the highest number of AIDS cases, it is predominantly a heterosexual disease. Changes in the environment occasionally drive rates of infectious diseases. Reforestation of the eastern United States has led to massive increases in the populations of deer and mice, which carry the ticks that transmit Lyme disease, babesiosis, and ehrlichiosis. Failure of DDT to control the mosquitoes that transmit malaria and the development of drug-resistant parasites have dramatically increased the morbidity and mortality of *Plasmodium falciparum* infection in Asia, Africa, and Latin America. Microbial adaptation to widespread antibiotic use contributed to the emergence of drug resistance in many species of bacteria, including *M. tuberculosis, N. gonorrhoeae, S. aureus*, and *E. faecium*. Infections with antibiotic-resistant

Table 8-9 Some Recently Recognized Infectious Agents and Manifestations

Date Recognized	Infectious Agent	Manifestations
1977	Ebola virus	Epidemic Ebola hemorrhagic fever
	Hantaan virus	Hemorrhagic fever with renal syndrome
	Legionella pneumophila	Legionnaire disease
	Campylobacter jejuni	Enteritis
1980	HTLV-I	T-cell lymphoma or leukemia, HTLV-associated myelopathy
1981	*Staphylococcus aureus*	Toxic shock syndrome
1982	*Escherichia coli* 0157:H7	Hemorrhagic colitis, hemolytic-uremic syndrome
	Borrelia burgdorferi	Lyme disease
1983	HIV	AIDS
	Helicobacter pylori	Gastric ulcers
1988	Hepatitis E	Enterically transmitted hepatitis
1989	Hepatitis C	Hepatitis C
1992	*Vibrio cholerae* 0139	New epidemic cholera strain
	Bartonella henselae	Cat-scratch disease
1995	KSHV (HHV-8)	Kaposi sarcoma in AIDS
1999	West Nile virus	West Nile fever, neuroinvasive disease
2003	SARS coronavirus	Severe acute respiratory syndrome