Chapter 11

DIGESTING ONESELF AND DIGESTING MICROBES
Autophagy as a Host Response to Viral Infection

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1. INTRODUCTION

The cellular pathway of autophagy is as ancient as the origins of eukaryotic life. Derived from the Greek and meaning to eat (“phagy”) oneself (“auto”), the term autophagy refers to a lysosomal pathway of self-digestion, involving dynamic membrane rearrangement to sequester cargo for delivery to the lysosome, where the sequestered material is degraded and recycled. For decades, it has been known that autophagy is the primary intracellular catabolic mechanism for the degradation and recycling of long-lived cellular proteins and organelles. For decades, it has also been known that the recycling function of autophagy is an important adaptive response to nutrient deprivation and other forms of environmental stress. However, only recently have we discovered that autophagy may also be an important mechanism for the degradation of intracellular pathogens and that autophagy may also be important in cellular protection against the stress of microbial infection. Not surprisingly, we have also recently learned that some successful intracellular pathogens have devised strategies either to block host autophagy or to subvert the host autophagic process to foster their own replication. In this chapter, we will review recent progress in understanding
the interrelationships between viruses, autophagy, and innate immunity (Figures 1 & 2).

![Diagram of autophagy](image)

**Figure 1.** Conceptual overview of protective roles of autophagy in mammalian and plant viral infections. Areas in boxed regions represent potential mechanisms by which autophagy exerts each type of protective effect. See text for details.

![Diagram of autophagy signaling pathways](image)

**Figure 2.** Conceptual overview of the interrelationships between autophagy signaling pathways, autophagy genes, autophagy functions in viral infections, and viral inhibitors of autophagy. See text for details.