# PDE12 cleaves 2'-5' oligoadenylates

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# Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

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## Literature references

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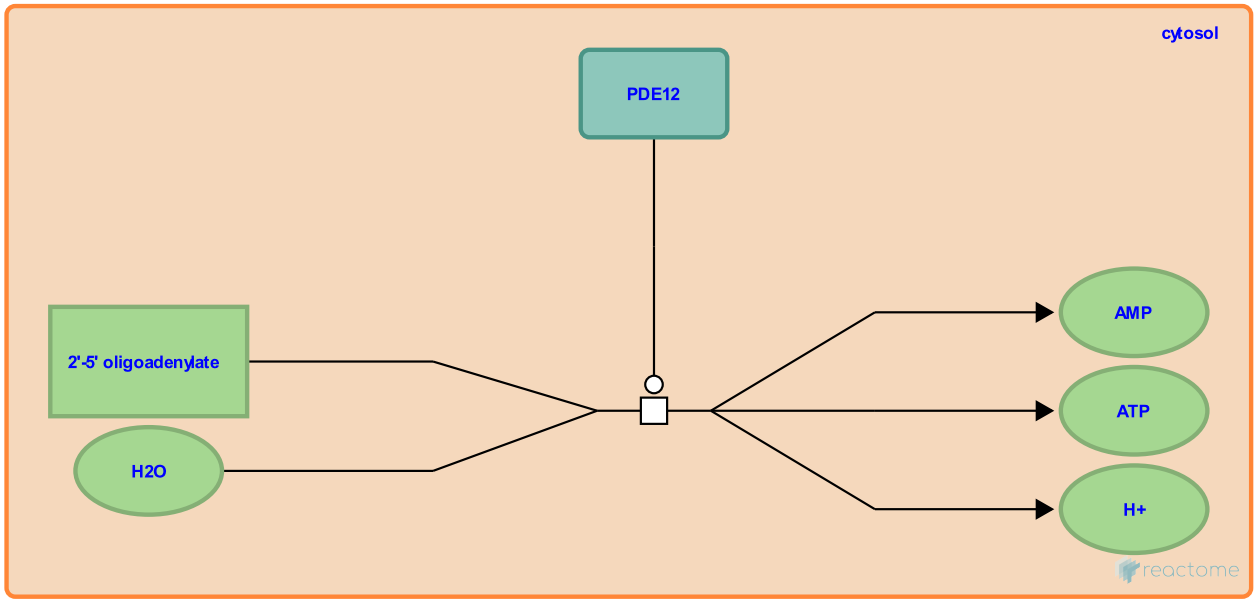
**Stable identifier:** R-HSA-9009950

**Type:** transition

**Compartments:** cytosol




Viral infection produces dsRNA that activates OAS isozymes to synthesize 5'-triphosphorylated 2'-5'-linked oligoadenylate (2-5A). Latent ribonuclease L (RNase L) binds 2-5A and oligomerizes into an active complex capable of cleaving ssRNA into retinoic acid-inducible gene-I (RIG-I) and nucleotide-binding oligomerization domain, leucine rich repeat and pyrin domain containing 3 (NLRP3) inflammasome-activating small RNAs (Malathi K et al. 2007; Chakrabarti A et al. 2015). Activation of RNase L can be attenuated by 2′-phosphodiesterase (PDE12)-mediated degradation of 2-5A. PDE12 is an endonuclease/exonuclease/phosphatase family member of deadenylases with both 3′,5′- and 2′,5′-phosphodiesterase activities. PDE12 localizes to the mitochondrial matrix and, in addition to degrading 2-5A, removes poly(A) tails from some mitochondrial mRNAs (Kubota K et al. 2004; Poulsen JB et al. 2011; Rorbach J et al. 2011; Silverman RH & Weiss SR 2014; Wood ER et al. 2015). The 2H phosphoesterase, AKAP7, is an unrelated nuclear enzyme that also degrades 2-5A (Gusho E et al. 2014). Several viruses, including some coronaviruses and rotaviruses, encode structurally related 2H phosphoesterases (each with two conserved histidine motifs) that degrade 2-5A and antagonize RNase L mediated antiviral activity (Zhao L et al. 2012; Zhang R et al. 2013; Silverman RH & Weiss SR 2014; Ogden KM et al. 2015; Sui B et al. 2016; Thornbrough JM et al. 2016; Goldstein SA et al. 2017).

## Literature references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## Editions

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