



# Precision Autophagy for Treating Inflammation and Other Diseases

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## Technology description

Discovery that IRGM, a protein within a distinctly human gene, which confers risk for inflammatory diseases, affects key autophagy regulators.

With the use of precision autophagy modulators, such as interferon gamma (IFN-gamma), pegylated interferon (PEG-IFN), and tripartite motif (TRIM), new treatments for inflammatory and autophagy related disease can be developed.

## Background

Autophagy is an intracellular process that removes cellular waste, maintains cellular health, and regulates inflammation. Autophagic dysfunction can lead to excessive inflammation which causes devastating diseases including cancer, neurodegenerative diseases (e.g. Huntington disease), and autoimmune diseases (e.g. diabetes mellitus). These lethal diseases impact millions of people each year. Therapeutic regimes for these diseases center on addressing autophagic dysfunction by inducing selective autophagy through various mechanisms.

The process by which autophagy machinery operates has been identified and progress made in identifying how autophagy recognizes its cargo. However, research surrounding autophagic receptors which initiate the pathway still lags. There is a need for therapeutic options, to treat inflammatory or autophagy related diseases, which are capable of precisely activating and modulating autophagy.

## Technology Description

Researchers at the University of New Mexico have discovered that IRGM, a protein within a distinctly human gene, which confers risk for inflammatory diseases, affects key autophagy regulators. With the use of precision autophagy modulators, such as interferon gamma (IFN-gamma), pegylated interferon (PEG-IFN), and tripartite motif (TRIM), new treatments for inflammatory and autophagy related disease can be developed.

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## Application area

Capable of mitigating multiple forms of inflammation, such as those caused by inflammasome or type I interferon response (IFN)

Precision autophagy utilizes TRIMs as receptors to regulate autophagic pathways

TRIMs mediate IFN- $\gamma$  induced autophagy and prevent excessive inflammasome activation in infectious and autoimmune diseases

Explicitly controls the assembly of autophagy regulators

Protects cellular health and promotes autophagy in unresponsive cells

Precision autophagy balances important immunological responses, potentially guarding against excessive inflammation, which may cause pathology during autoimmune processes

A large family of human TRIMs (70 members) allows precision in deploying autophagy, while sparing cellular contents from wholesale degradation

Applicable in treating inflammatory related disease including, autoimmune diseases, infectious diseases, neurodegenerative, cardiovascular diseases, and metabolic diseases

## Institution

[The University of New Mexico](http://The University of New Mexico)

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