ScienceWatch Home
Inside This Month...
Interviews

Featured Interviews
Author Commentaries
Institutional Interviews
Journal Interviews
Podcasts

Analyses

Featured Analyses
What's Hot In...
Special Topics

Data & Rankings

Sci-Bytes
Fast Breaking Papers
New Hot Papers
Emerging Research Fronts
Fast Moving Fronts
Corporate Research Fronts
Research Front Maps
Current Classics
Top Topics
Rising Stars
New Entrants
Country Profiles

About Science Watch

Methodology
Archives
Contact Us
RSS Feeds

JOURNAL INTERVIEWS - 2009

July 2009

PDF

Autophagy

Featured Journal Interview

According to a recent analysis of Essential Science Indicators*SM from Thomson Reuters, the journal* Autophagy *is having a growing impact in the field of Biology & Biochemistry. Its record in this field includes 414 papers cited a total of 2,692 times from its launch in 2005 to February 28, 2009. In our Special Topics analysis on autophagy, the journal ranks at #1 by total number of papers and #4 by total cites among journals publishing on the topic over the past decade.* Autophagy *is published by Landes Bioscience.*

In the interview below, ScienceWatch.com *talks with* Autophagy's *Editor-in-Chief, Dr. Daniel Klionsky, about the journal's history and citation record.*

SW: Did you expect *Autophagy* to become highly cited, or is this surprising to you?

I certainly hoped that *Autophagy* would become highly cited, and the editors and I have definitely been working to make that happen.

SW: How would you account for the increased citation rate of *Autophagy*?

The field continues to expand—there has been a dramatic increase in autophagy research over the past 10 years. With more researchers working on this topic, there are more people who will potentially cite papers in this area. We have already observed the impact of this growth on autophagy citations. For example, there has been at least a 10-fold increase in the number of papers that include "autophagy" as a keyword since 1999.

SW: Was there a change in policy or editorial direction that might account for this?

Yes. There has been a conscious effort by the associate editors and the members of the editorial board to increase the stringency for accepting papers. We want to set a high standard for the quality of papers published in our field, and our acceptance rate has been decreasing accordingly as we keep pushing the bar higher.

As a result, the quality of our papers continues to increase, which should lead to more citations per paper. At the same time, we are receiving more papers than in previous years, so even with high standards we are publishing several more papers per issue of the journal, which also accounts for an increase in total citations.

SW: What historical factors have contributed to the success of *Autophagy*?

Although autophagy has been studied for approximately 50 years, the molecular understanding of this process began little more than a decade ago. As a result, we are in a phase where scientists are discovering new connections between autophagy and other research topics at an amazing rate. Many people are now asking the question as to whether defects in, or the induction of, autophagy can explain observations that in some cases were made several years ago. With the molecular tools in hand, researchers can now start to answer that question.

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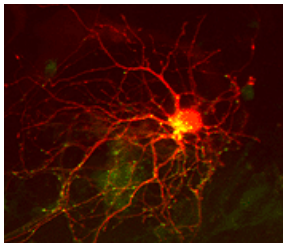

Neuron in mCherry, with GFP-LC3 showing autophagosomes.

SW: Have there been specific developments in the fields served by *Autophagy* that may have contributed?

Advances in various fields have definitely allowed researchers to appreciate the contributions of autophagy. For example, autophagy is an essential process depending on the organism and the stress conditions. In mammals, autophagy is required to proceed past the four- to eight-cell stage during embryogenesis, which makes it difficult to study the effects of gene deletions. The development and application of the Cre-flox system that allows tissue-specific and developmentally regulated knockouts of autophagy-related genes has permitted researchers to overcome some of the problems associated with knocking out essential genes.

In addition, the improvement in fluorescent protein technology has facilitated a wide range of studies that are focused on the localization of autophagy proteins. The many connections between autophagy and other pathways has attracted a large number of highly skilled and imaginative researchers to this field, and this has led, and continues to lead, to the development of novel reagents and techniques that further everyone's ability to study this process.

SW: What, in your view, is this journal's main significance or contribution in the field of Biology & Biochemistry?

I think it is quite unusual at this point in time for researchers to uncover an essentially unknown (again, in terms of the molecular components) pathway that requires at least 20 to 30 proteins. One of the reasons autophagy is such a fascinating topic is because it involves many different aspects of cell biology and biochemistry. For example, there are issues of regulation and signal transduction. Autophagy occurs at a basal level, but can be induced in response to various types of stress. However, too much autophagy can be just as much of a problem as too little. Thus, autophagy has to be tightly regulated, and we are just beginning to work out the control mechanisms.

For those interested in proteins and protein-protein interactions, autophagy is unique because it employs novel protein modifications. There are two ubiquitin-like autophagy-related proteins, one of which becomes conjugated to a phospholipid. This protein, Atg8 (also called LC3 in mammals) likely plays a critical role in autophagy, but its function is still not entirely known. This is also a pathway that involves dynamic membrane rearrangements.

The best-characterized type of autophagy is macroautophagy, in which a double-membrane cytosolic vesicle, an autophagosome, is formed that sequesters portions of the cytoplasm. Unlike vesicles that form throughout the secretory pathway, autophagosomes form *de novo*. By that, I mean that they do not bud off from a preexisting organelle, or form in a single step. Rather, they expand from an initial membrane structure, the phagophore, probably through the addition of membrane by vesicular fusion. The source of the membrane for phagophore expansion is not known with certainty, and the mechanism of autophagosome formation is the focus of intensive investigation. One important point is that this unique mechanism of vesicle formation means that the autophagosome can sequester essentially any type of cargo including invasive pathogens or entire organelles.

Therefore, autophagy plays an important role in cellular remodeling, removal of damaged or superfluous organelles, and cellular homeostasis. So, autophagy is interesting both at a basic level to scientists interested in understanding how the cell works, and at a clinical level, because there is tremendous potential in manipulating autophagy for therapeutic purposes. What more can you ask for?

SW: How do you see your field(s) evolving in the next few years?

Because of the complexity, the molecular mechanism of autophagy will not be elucidated in the near future. Thus, many researchers will continue to work on the basic cell biology and biochemical aspects of this process. There will also be an

"Although autophagy has been studied for approximately 50 years, the molecular understanding of this process began little more than a decade ago."

expansion into the clinical aspects of autophagy research. For example, autophagy participates in tumor suppression, and many scientists are investigating whether the induction or suppression of autophagy can help kill cancer cells, in part by making them more susceptible to anticancer agents.

Another topic with tremendous potential is the area of neurodegeneration. Some elegant studies have indicated that autophagy plays a role in protecting against certain neurodegenerative diseases. I do not think it is too far-fetched to consider the possibility that we could eventually modulate autophagy in a tissue-specific manner to prevent the onset, or at least ameliorate the symptoms, of some types of neurodegeneration. Autophagy occurs in all eukaryotes and probably in most if not all tissues, so the possibilities are extensive.

SW: What role do you see for your journal?

I see several roles for *Autophagy*. As I indicated above, I think we need to set a standard for autophagy research. Along these lines, we published an article on the guidelines for the use and interpretation of assays for monitoring autophagy in higher eukaryotes, because I thought it was important to establish a working set of recommendations. Over 200 researchers in the field contributed to the guidelines, which provide a reference for anyone interested in this topic, especially people new to the field.

Because I think we will continue to see an increase in clinical autophagy research, it is important that clinical and basic scientists interact and be aware of each other's work. However, many people carrying out applied research publish in journals that basic scientists do not routinely read, and vice versa. Therefore, *Autophagy* has started to encourage scientists to submit clinically oriented research papers by adding associate editors who are familiar with clinical research, and introducing a category specifically for clinical studies.

One aspect of science that I have always enjoyed is working with others. Therefore, one goal of *Autophagy* is to facilitate the development of a community, and to keep the field friendly. Currently, I think autophagy is a very interactive and welcoming field. Reagents are freely exchanged, and many laboratories collaborate. One of the ways the journal attempts to encourage communication is by soliciting reviews on specific topics from multiple labs working in particular areas; minimally, the authors need to communicate with each other to work on the review article, and that may lead to further interactions.

Finally, *Autophagy* will continue to seek ways to advance the field. For example, we are just about to launch a new feature that provides protocols online, which can be updated as needed. There will also be a method for investigators to post questions to the authors, which can be answered online. Autophagy is in its infancy, and is a rapidly changing field at present. *Autophagy* will attempt to facilitate research in this field by involving the top researchers on its editorial board, attracting the best research papers, and evolving as necessary to reflect the needs of the growing body of scientists working in this area.

Autophagy
Dr. Daniel Klionsky, Editor-in-Chief
Landes Bioscience, publishers

***Autophagy's* current most-cited paper in *Essential Science Indicators*, with 102 cites:**

Tanida I, *et al*., "Lysosomal turnover, but not a cellular level, of endogenous LC3 is a marker for autophagy," *Autophagy* 1(2): 84-91, July-September 2005. Source: *Essential Science Indicators* from Thomson Reuters.

Additional Information:

Autophagy is listed as a top journal in the Special Topic of Autophagy.

KEYWORDS: AUTOPHAGY, CITATION RATE, MOLECULAR TOOLS, EMBRYOGENESIS, GENE DELETIONS, CRE-FLOX SYSTEM, KNOCKOUTS, FLUORESCENT PROTEIN TECHNOLOGY, CELL BIOLOGY, BIOCHEMISTRY, REGULATION, SIGNAL TRANSDUCTION, CONTROL MECHANISMS, PROTEINS, MACROAUTOPHAGY, CELLULAR REMODELING, TUMOR SUPPRESSION, NEURODEGENERATION, CLINICALLY ORIENTED RESEARCH.

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back to top