

Guidelines for the use and interpretation of assays for monitoring autophagy (4th edition)¹.

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 Iban 1822 Seki Ekihiro 1823 Selleck Scott B. 1824 Sellke Frank W. 1825 Selsby Joshua T. 1826
 Sendtner Michael 1303 Senturk Serif 1827 Seranova Elena 1777 Sergi Consolato 1828
 Serra-Moreno Ruth 1829 Sesaki Hiromi 1830 Settembre Carmine 58 134 Setty Subba Rao Gangi
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 1867 Silva Johnatas D. 1121 Silva-Pavez Eduardo 27 Silvente-Poirot Sandrine 1648 Simmonds
 Rachel E. 836 Simon Anna Katharina 202 Simon Hans-Uwe 1868 Simons Matias 1869 Singh
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 1618 Smertenko Andrei 1881 Smith Matthew D. 1882 Soenen Stefaan J. 1348 Sohn Eun Jung
 1883 Sok Sophia P. M. 850 Solaini Giancarlo 144 Soldati Thierry 318 Soleimanpour Scott A. 1884
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 Stephan 1907 Stork Björn 1908 Strappazzon Flavie 1909 Strohecker Anne Marie 1910 Stupack
 Dwayne G. 548 Su Huanxing 1294 Su Ling-Yan 1305 Su Longxiang 1911 Suarez-Fontes Ana M.
 1912 Subauste Carlos S. 1913 Subbian Selvakumar 1914 Subirada Paula V. 938 Sudhandiran
 Ganapasam 1915 Sue Carolyn M. 1916 Sui Xinbing 1917 Summers Corey 1918 Sun Guangchao
 1919 Sun Jun 1920 Sun Kang 1921 Sun Meng-xiang 1922 Sun Qiming 1923 Sun Yi 1924 Sun
 Zhongjie 1925 Sunahara Karen K.S. 1926 Sundberg Eva 1927 Susztak Katalin 1928 Sutovsky
 Peter 1929 Suzuki Hidekazu 1930 Sweeney Gary 1931 Symons J. David 1932 Sze Stephen Cho
 Wing 1933 Szewczyk Nathaniel J. 1934 Tabacka-Onczyńska Anna 1935 Tabolacci Claudio 651
 1936 Tacke Frank 1937 Taegtmeyer Heinrich 1938 Tafani Marco 745 Tagaya Mitsuo 79 Tai

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School of Pharmacy, Instituto de Biomedicina de Sevilla. Sevilla, Spain 1733 University of Cambridge, Cambridge Institute for Medical Research, UK Dementia Research Institute and Department of Medical Genetics, Cambridge, UK 1734 Lomonosov Moscow State University, Chemistry Department, Moscow, Russia 1735 University Medical Center Eppendorf, Institute for Medical Microbiology, Hamburg, Germany 1736 Charles University, Faculty of Medicine in Hradec Kralove, Department of Medical Biology and Genetics, Hradec Kralove, Czech Republic 1737 Mannheim University of Applied Sciences, Faculty of Biotechnology, Mannheim, Germany 1738 Fondazione IRCCS Istituto Neurologico Carlo Besta, Neuromuscular Disease and Immunology Unit, Milan, Italy; University of Brescia, Unit of Biology and Genetics, Department of Molecular and Translation Medicine, Brescia, Italy 1739 Australian Regenerative Medicine Institute, Monash University, Clayton, Victoria, Australia 1740 University of Ottawa, Department of Cellular and Molecular Medicine, Ottawa, ON, Canada 1741 National Research Council, Institute of Food Sciences, Avellino, Italy 1742 Stazione Zoologica "Anton Dohrn", Napoli, Italy 1743 University of Calabria, Department of Pharmacy, Health and Nutritional Sciences, Cosenza, Italy 1744 N.N. 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 of Medical Research, Sydney, NSW, Australia 1757 Institute for Research in Biomedicine (IRB
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 Sugitani, Toyama, Japan 1759 Kyoto University, Graduate School of Agriculture, Division of Applied
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 Helsinki University Hospital, Department of Virology, Helsinki, Finland 1762 Florida State
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 1779 University of Delhi South Campus, Department of Genetics, New Delhi, India 1780 Folkhälsan
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 Zürich, Department of Gastroenterology and Hepatology, Zürich, Switzerland 1788 University of
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 Grenoble Alpes and Inserm U1055, Laboratory of Fundamental and Applied Bioenergetics (LBFA),

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 1797 Hannover Medical School, Department of Nephrology and Hypertension, Hannover, Germany
 1798 National Institutes of Health, National Institute of Allergy and Infectious Disease, Vaccine Research Center, Bethesda, MD, USA 1799 Ruhr-University Bochum, Department of Molecular Immunology, Bochum, Germany 1800 German Center for Neurodegenerative Diseases, DZNE, Bonn, Germany and Department of Neurodegenerative Diseases and Geriatric Psychiatry, University Bonn, Bonn, Germany 1801 Research Center Borstel, Leibniz Lung Center, Priority Research Area Infections, Junior Research Group Coinfection, Borstel, Germany 1802 Johannes Kepler University Linz, Institute of Biophysics, Linz, Austria 1803 Instituto de Investigaciones en Ingeniería Genética y Biología Molecular Dr. Héctor N. 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8 2 2021 2021 17 1 378393 1 382 08 02 2022 08 02 2022 23 08 2025 Integra 08 3 2021 Integra 08 3 2021 14 7 2020 © 2020 Informa UK Limited, trading as Taylor & Francis Group 2020 Informa UK Limited, trading as Taylor & Francis Group ABSTRACT In 2008, we published the first set of guidelines for standardizing research in autophagy. Since then, this topic has received increasing attention, and many scientists have entered the field. Our knowledge base and relevant new technologies have also been expanding. Thus, it is important to formulate on a regular basis updated guidelines for monitoring autophagy in different organisms. Despite numerous reviews, there continues to be confusion regarding acceptable methods to evaluate autophagy, especially in multicellular eukaryotes. Here, we present a set of guidelines for investigators to select and interpret methods to examine autophagy and related processes, and for reviewers to provide realistic and reasonable critiques of reports that are focused on these processes. These guidelines are not meant to be a dogmatic set of rules, because the appropriateness of any assay largely depends on the question being asked and the system being used. Moreover, no individual assay is perfect for every situation, calling for the use of multiple techniques to properly monitor autophagy in each experimental setting. Finally, several core components of the autophagy machinery have been implicated in distinct autophagic processes (canonical and noncanonical autophagy), implying that genetic approaches to block autophagy should rely on targeting two or more autophagy-related genes that ideally participate in distinct steps of the pathway. Along similar lines, because multiple proteins involved in autophagy also regulate other cellular pathways including apoptosis, not all of them can be used as a specific marker for bona fide autophagic responses. Here, we critically discuss current methods of assessing autophagy and the information they can, or cannot, provide. Our ultimate goal is to encourage intellectual and technical innovation in the field.