

# Disease Models & Mechanisms

The online version of Disease Models & Mechanisms is considered to be the version of record

## EDITOR-IN-CHIEF

**Monica J. Justice, PhD**  
The Hospital for Sick Children (SickKids), Canada

## SENIOR EDITOR

**Ross Cagan, PhD**  
Mount Sinai, USA

## MONITORING EDITORS

**Steven J. Clapcote, PhD**  
University of Leeds, UK  
**Pamela Hoodless, PhD**  
BC Cancer Agency, Canada  
**Tatsushi Igaki, PhD**  
Kyoto University, Japan  
**Elaine Mardis, PhD**  
Nationwide Children's Hospital, USA  
**E. Elizabeth Patton, PhD**  
MRC Institute of Genetics and Molecular Medicine, UK

**Owen Sansom, PhD**  
Beatson Institute for Cancer Research, UK  
**David Tobin, PhD**  
Duke University School of Medicine, USA

## CONSULTING EDITOR

**George Tidmarsh, MD, PhD**  
La Jolla Pharmaceutical Company, USA

## SCIENTIFIC EDITOR

**Julija Hmeljak, PhD**

## MANAGING EDITOR

**Rachel Hackett**

## PRODUCTION EDITORS

**Jodie Houghton**  
**Melissa Ray, PhD**  
**Angela Willcox**

## EDITORIAL ADMINISTRATORS

**Debbie Thorpe**  
**Beth Pollard**

## PUBLISHER

**O. Claire Moulton, PhD**

## FOUNDING EDITOR-IN-CHIEF

**Vivian Siegel, PhD**  
Vanderbilt University, USA  
MIT, USA

## EDITORIAL BOARD

**Tim Aitman, MD, PhD**  
The University of Edinburgh, UK  
**Frances Balkwill, PhD**  
Barts Cancer Institute, UK  
**Dirk Bohmann, PhD**  
University of Rochester Medical Center, USA  
**Nancy M. Bonini, PhD**  
University of Pennsylvania, USA  
**Guy Caldwell, PhD**  
University of Alabama, USA  
**Robert Cardiff, MD, PhD**  
University of California Davis, USA  
**Hans Clevers, MD, PhD**  
Hubrecht Laboratory, The Netherlands  
**Sabine P. Cordes, PhD**  
Lunenfeld-Tanenbaum Research Institute,  
Canada

**James Dowling, MD, PhD**  
The Hospital for Sick Children, Canada

**Elaine Dzierzak, PhD**  
University of Edinburgh, UK  
**Jonathan A. Epstein, MD**  
Perelman School of Medicine, USA  
**Elizabeth Fisher, PhD**  
University College London, UK  
**Yasuyuki Fujita, MD, PhD**  
Hokkaido University, Japan  
**Aron M. Geurts, PhD**  
Medical College of Wisconsin, USA  
**Aaron D. Gitler, PhD**  
Stanford University School of  
Medicine, USA

**David Hackam, MD, PhD**  
Johns Hopkins Children's Center, USA

**Antonis Hatzopoulos, PhD**  
Vanderbilt University, USA

**Brigid Hogan, PhD**  
Duke University, USA

**Deborah Hung, MD, PhD**  
Harvard Medical School, USA

**Philip Ingham, PhD**  
University of Exeter, UK

**Raghu Kalluri, MD, PhD**  
MD Anderson Cancer Center, USA

**Matthew F. Krummel, PhD**  
University of California San Francisco, USA

**Jeanne Magram, PhD**  
Quentis Therapeutics, Inc., NY, USA

## Kelly McNagny, PhD

The University of British Columbia, Canada

**Annemarie H. Meijer, PhD**  
University of Leiden, The Netherlands

**Marco Milán, PhD**  
IRB Barcelona, Spain

**Jason Mills, MD, PhD**  
Washington University School of Medicine,  
USA

**Richard I. Morimoto, PhD**  
Northwestern University, USA

**Norbert Perrimon, PhD**  
Harvard Medical School, USA

**Randall T. Peterson, PhD**  
University of Utah, USA

**Stefano Piccolo, PhD**  
University of Padua, Italy

**Steve Pollard, PhD**  
Edinburgh Cancer Research Centre, UK

**Susan Quaggin, MD**  
Northwestern University, USA

**Lalita Ramakrishnan, MD, PhD**  
University of Cambridge, UK

**Paul Riley, PhD**  
University of Oxford, UK

**Kirsten Sadler Edepli, PhD**  
New York University, Abu Dhabi

**Paul Schofield, PhD**  
University of Cambridge, UK

**Almut Schulze, PhD**  
University of Würzburg, Germany

**Chad A. Shaw, PhD**  
Baylor College of Medicine, USA

**James Shorter, PhD**  
University of Pennsylvania, USA

**Ian M. Smyth, PhD**  
Monash University, Australia

**Katalin Susztak, MD, PhD**  
University of Pennsylvania, USA

**David Vaux, PhD**  
The Walter and Eliza Hall Institute of Medical  
Research, Australia

**Maria Yuneva, PhD**  
The Francis Crick Institute, UK

**Dawang Zhou, PhD**  
Xiamen University, China

**Leonard I. Zon, MD**  
Harvard Stem Cell Institute, USA

## About the Publisher

The Company of Biologists is a not-for-profit publishing organisation dedicated to supporting and inspiring the biological community. The Company publishes five specialist peer-reviewed journals: Development, Journal of Cell Science, Journal of Experimental Biology, Disease Models & Mechanisms and Biology Open. It offers further support to the biological community by facilitating scientific meetings, providing travel grants for researchers and supporting research societies.

[www.biologists.com](http://www.biologists.com)

© 2019. Published by The Company of Biologists Ltd.

## FOUNDING EDITORS

**Gerard Evan, PhD**  
**Mark C. Fishman, MD**  
**Susan Lindquist, PhD**  
**Stephen O'Rahilly, MD**  
**Nadia Rosenthal, PhD**

**Janet Rossant, PhD**  
**Allan Spradling, PhD**  
**Tian Xu, PhD**  
**Magdi Yacoub, MD**  
**Huda Zoghbi, MD**

## Disease Models & Mechanisms

The Company of Biologists Ltd, Bidder Building, Station Road, Histon, Cambridge, CB24 9LF, UK  
Tel: +44 (0)1223 632684 Fax: +44 (0)1223 632875 E-mail: [dmm@biologists.com](mailto:dmm@biologists.com)

Disease Models & Mechanisms ISSN 1754-8403 (Print) ISSN 1754-8411 (Online)