# **Imaging Unveils Temperature Distribution inside Living Cells**

Philadelphia, Pa. – A research team in Japan exploring the functions of messenger ribonucleic acid (mRNA) – a molecule that encodes the chemical blueprint for protein synthesis – has discovered a way to take a close look at the temperature distribution inside living cells. This discovery may lead to a better understanding of diseases, such as cancer, which generate extraordinary intracellular heat.

This breakthrough is the first time anyone has been able to show the actual temperature distribution inside living cells. The team will present their findings at the 57th Annual Meeting of the Biophysical Society (BPS), held Feb. 2-6, 2013, in Philadelphia, Pa.

Conventional temperature imaging methods lack spatial resolution and sensitivity, which means these methods are incapable of imaging extremely tiny temperature differences inside living cells. To overcome these issues, the team developed a new imaging method that combines a highly sensitive thermometer with an incredibly accurate detection technique, enabling the creation of detailed intracellular temperature maps.

"Our imaging method allows us to clearly see the temperature inside living cells, and we found that the temperature differs greatly depending on the location in the cell," says Kohki Okabe, an assistant professor at the University of Tokyo's Laboratory of Bioanalytical Chemistry, Graduate School of Pharmaceutical Science. "We discovered that the temperature difference is related to the various stages of the cell cycle."

This research provides a novel point of view: Temperature not only regulates biological molecules, but it actually contributes to cellular functions.

"By incorporating cellular temperature mapping into the analysis of any kind of cellular event, we can achieve a deeper understanding of cellular functions," Okabe explains. "It is our hope that by using this method of temperature imaging, the pathogenesis of diseases known to generate significant heat within cells, such as cancer, can be clarified. We believe this may help lead to future cures."

Next, Okabe and colleagues plan to explore how temperature contributes to cellular functions in even greater detail, as well as investigating differences in the intracellular temperatures of various living cells.

Presentation #1033-Plat, "Imaging of temperature distribution in a living cell," will take place at 11:45 a.m. on Monday, Feb. 4, 2013, in the Pennsylvania Convention Center, Room 113AB. ABSTRACT: <a href="http://tinyurl.com/b6dnae6">http://tinyurl.com/b6dnae6</a>

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This news release was prepared for the Biophysical Society (BPS) by the American Institute of Physics (AIP).

#### **ABOUT THE 2013 ANNUAL MEETING**

Each year, the Biophysical Society Annual Meeting brings together over 6,000 research scientists in the multidisciplinary fields representing biophysics. With more than 3,900 poster presentations, over 200 exhibits, and more than 20 symposia, the Annual Meeting is the largest meeting of biophysicists in the

world. Despite its size, the meeting retains its small-meeting flavor through its subgroup meetings, platform sessions, social activities, and committee programs.

The 57<sup>th</sup> Annual Meeting will be held at the Pennsylvania Convention Center (1101 Arch Street, Philadelphia, PA 19107). For maps and directions, please visit: http://www.paconvention.com/explore-philadelphia/directions-and-parking.

#### **QUICK LINKS**

Meeting Home Page:

http://www.biophysics.org/2013meeting/Main/tabid/3523/Default.aspx

Housing and Travel Information:

http://www.biophysics.org/2013meeting/AccommodationsTravel/HotelInformation/tabid/3621/Default .aspx

Program Abstracts and Itinerary Planner:

http://www.abstractsonline.com/plan/start.aspx?mkey=%7B763246BB-EBE4-430F-9545-81BC84D0C68C%7D

## **PRESS REGISTRATION**

The Biophysical Society invites credentialed journalists, freelance reporters working on assignment, and public information officers to attend its Annual Meeting free of charge. For more information on registering as a member of the press, contact BPS Director of Public Affairs and Communications Ellen Weiss at <a href="mailto:eweiss@biophysics.org">eweiss@biophysics.org</a> or 240-290-5606, or visit

http://www.biophysics.org/2013meeting/Registration/Press/tabid/3619/Default.aspx. Press registration will also be available onsite at the Pennsylvania Convention Center in the Biophysical Society's meeting office, Room 304VIP.

### **ABOUT BPS**

The Biophysical Society (BPS), founded in 1958, is a professional scientific society established to encourage development and dissemination of knowledge in biophysics. The Society promotes growth in this expanding field through its annual meeting, monthly journal, and committee and outreach activities. Its 9000 members are located throughout the U.S. and the world, where they teach and conduct research in colleges, universities, laboratories, government agencies, and industry. For more information on the Society or the 2013 Annual Meeting, visit <a href="https://www.biophysics.org">www.biophysics.org</a>.

## For more information, please contact:

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