

Propping Open the Blood Brain Barrier: New approach to delivering therapeutics could lead to better treatment of central nervous system disorders

Philadelphia, Pa. – The treatment of central nervous system (CNS) diseases can be particularly challenging because many of the therapeutic agents such as recombinant proteins and gene medicines are not easily transported across the blood-brain barrier (BBB). Focused ultrasound can be used to “open the door” of the blood brain barrier. However, finding a way to “prop the door open” to allow therapeutics to reach diseased tissue without damaging normal brain tissue is the focus of a new study by a team of researchers at the Institute of Biomedical Engineering at National Taiwan University presenting at the 57th Annual Meeting of the Biophysical Society (BPS), held Feb. 2-6, 2013, in Philadelphia, Pa.

The group is investigating the feasibility of using heparin, a common anticoagulant, to enhance the delivery of therapeutic macromolecules using ultrasound into the brain. Heparin could be employed to increase treatment efficacy in patients with different types of CNS diseases under the guidance of medical imaging system providing new hope in these challenging cases. Initial results show that heparin does have the potential to optimize therapeutic delivery with ultrasound, acting as a “doorstop,” allowing drugs to better permeate the BBB and enhancing treatment success.

“A higher acoustic pressure and longer sonication, and/or a higher dose of microbubbles may increase the delivery of drugs or tracers into the sonicated brain tissue,” explains Kuo-Wei Lu, a member of the research team, “but side-effects, such as microhemorrhage, can also increase dramatically. The results of this study indicate that heparin may offer a safer way can to enhance the delivery of therapeutics to patients with CNS diseases.”

With these encouraging results, the next step for the team is to develop a focused ultrasound system with Magnetic Resonance Imaging (MRI) guidance to establish suitable parameters needed for patient clinical trials. “Focused ultrasound sonication is a noninvasive technology capable of localized and transient BBB opening for the delivery of CNS therapeutics,” Lu states. “We hope by developing suitable parameters and using chemical enhancers like heparin, this can be a valuable tool in the treatment of patients with CNS diseases, opening the door to better patient outcomes.”

Presentation #3539-Pos, “Impact of initial vascular permeability and recovery speed of disrupted blood-brain barrier on nanodrug delivery into the brain tissue,” will take place at 10:30 a.m. on Wednesday, Feb. 6, 2013, in the Pennsylvania Convention Center, Hall C. ABSTRACT: <http://tinyurl.com/adycds6>

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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 57th 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 eweiss@biophysics.org 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 www.biophysics.org.

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