June 2017

HMT Newsletter

Friends and Colleagues,

After kicking off this new year by opening our new office in Leiden, Netherlands, we are announcing progress in our MDD biomarker validation studies and our first give-away for new projects starting this Month (see details below).
Laura Shelton has summarized our publications in this issue spanning work in cancer and glucose metabolism. Enjoy our first issue of the summer.

Sincerely,

Alexander Buko, PhD
Vice President
Human Metabolome Technologies America

HMT Updates

Campaign

Heat up your research this summer with Metabolomics

Receive an iPad with all new projects in June

- Untargeted, Targeted or Isotope tracing platforms
- Full statistical analysis and biological interpretation
- 4-8 weeks data delivery
- Minimum study size: 6 samples
- iPad 32 GB in your favorite color

Special offer expires on June 30th, 2017

Get more details in our website

News release

On May 23, 2017 Human Metabolome Technologies Biomedical Co., Ltd. (HMT Biomedical Co.) has announced the approval in Japan for the manufacturing and wholesale distribution of diagnostic kits to be used in clinical studies for the *in vitro* assay of phosphoethanolamine as a blood biomarker for Major Depressive Disorder (MDD). As a member of the HMT group, HMT Biomedical Co. was founded in January 2016 and has completed beta testing of the assay kit for MDD. Under this approval, HMT can directly distribute the MDD assay kit to medical institutes in Japan.

Event Information

HMT Student Grant Award for Young Leaders in Metabolomics 2017

We are looking for Masters and PhD candidates who aim to use metabolomics as an integral component of their research. The award includes free analysis of metabolic profiling and data interpretation. Please contact our website for more details.

Beatson International Cancer Conference
July 2- July 5, Glasgow, Scotland

HMT will join the conference as an exhibitor. We look forward to meeting you and discussing the latest updates in cancer metabolism.

Featured articles

Cancer metabolism

Metabolic characterization of invaded cells of the pancreatic cancer cell line, PANC-1

Fujita M., *et al., Cancer Sci.*, in press.

While only a small fraction of PANC-1 cells display an invasive phenotype when cultured in matrigel, these cells were found to have a metabolically distinct profile. The invasive cells displayed increased energy consumption and reduced GSH levels. The invasive population was more resistant to hydrogen peroxide induced oxidative stress suggesting that GSH plays a major role in the development of this aggressive phenotype.

Metabolic analysis of radioresistant medulloblastoma stem-like clones and potential therapeutic targets

Sun L., *et al., PLoS One*, **12**: e0176162.

Medulloblastoma is often fatal in children due to a radioresistant stem-like population. This population was shown to be in a low energy state with reduced numbers of mitochondria and high glycolysis. Treatment with the glycolysis inhibitor Dichloroacetate (DCA) significantly reduced glycolysis, increased ROS, and increased radiosensitivity in the stem-like population.

Folate cycle enzyme MTHFD1L confers metabolic advantages in hepatocellular carcinoma

Lee D., *et al., J. Clin. Invest., 2017*, **127**, *pp*. 1856-1872.

The folate cycle in the cytoplasmic and mitochondrial compartments is responsible for producing metabolites essential for cell growth, such as nucleotides, methionine, NADPH etc. By using hepatocellular carcinoma, the authors observed a reduction in growth rate upon withdrawal of folate, and found that a key enzyme in the folate cycle plays an essential role in support of cancer growth. The activity of MTHFD1L is modulated by NRF2, a master regulator of redox homeostasis, and is suggested to contribute to the production and accumulation of NADPH to levels that are sufficient to combat oxidative stress in cancer cells.

Glucose metabolism for health management

Astrocytic glycogen-derived lactate fuels the brain during exhaustive exercise to maintain endurance capacity

Matsui T., *et al., Proc Natl Acad Sci U S A.*, in press.

The brain stores glycogen in astrocytes to produce lactate as an energy source that can be transported to active neurons via the monocarboxylate transporter MCT2, but the energetic role of astrocytic glycogen in the exercising brain remains unknown. To address this issue, the authors performed metabolic profiling in a rat model of prolonged exhaustive exercise, and observed direct evidence that lactate derived from astrocytic glycogen fuels the prolonged-exercising brain to maintain endurance capacity.

Altered glucose metabolism and hypoxic response in alloxan-induced diabetic atherosclerosis in rabbits

Matsuura Y., *et al., PLoS One*, **12**: e0175976.

Diabetes mellitus accelerates atherosclerosis that causes most cardiovascular events but comprehensive metabolic alterations in atherosclerotic arterial cells remain unknown. A metabolomic analysis of arterial cells revealed 12 metabolites unique to diabetic vs non diabetic atherosclerosis. An altered glucose metabolism and response to hypoxia defined diabetic atherosclerosis.

Low glucose induces mitochondrial reactive oxygen species via fatty acid oxidation in bovine aortic endothelial cells.

Kajihara N., *et al., J. Diabetes Investig.*, in press.

Hypoglycemia and ROS are associated with vascular events, though the direct mechanism linking them is unclear. Here the authors show that fatty acid oxidation during low glucose conditions is upregulated, and inhibition of fatty acid transport via etomoxir reduced low glucose induced ROS.

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