

October 29, 2018

Dear Colleagues,

Thank you for your interest and/or past participation in NIST Quality Assurance Programs (QAPs). Future studies conducted by NIST are now included in the new Health Assessment Measurements Quality Assurance Program (HAMQAP), which offers opportunities for testing of a variety of analytes in matrices that reflect both human intake (e.g., foods, dietary supplements, natural products) and human metabolism (e.g., urine, blood, serum, plasma, human milk). For more information regarding HAMQAP and our other QAPs, visit <https://qa.nist.gov>. We hope that within this program you will find studies that are of interest and use to your laboratory.

Exercise 3 of HAMQAP is now open for sign up. Exercise 3 will be comprised of the studies listed below. A brief description of each study is provided to better explain the rationale for conducting the study and how the intake and metabolism studies relate, as appropriate. Participants may elect to sign up for some or all studies, as applicable to the work done in their laboratories. Laboratories may elect to participate in specific sample sets (e.g., dietary intake versus human metabolites), and may also elect to report selected analytes (e.g., only reporting total folate, but not individual folate forms). *Laboratories participating in human metabolites studies should have proper facilities (e.g., biosafety level 2 laboratory or equivalent) and training prior to conducting work with human fluids.*

Nutritional Elements

Iodine, an essential mineral, is required in the synthesis of thyroid hormones that regulate metabolism, and selenoproteins (which contain selenium) mediate thyroid hormone metabolism. An accurate assessment of these elements in foods, supplements, and biological samples is necessary to understand iodine and selenium metabolism and impact on thyroid health.

Dietary Intake Study

Iodine, Selenium
 Table Salt, Cat Food*, Protein Drink

Human Metabolism Study

Iodine, Selenium, Thyroid Hormones
 Human Milk, Human Serum

Toxic Elements

Potential uptake of toxic elements from the soil may lead to contamination of plant-based foods and supplements and negative health outcomes for consumers. Testing of these foods and supplements can ensure safety for consumers and testing of blood can identify such consumer exposure to toxic elements.

Dietary Intake Study

Arsenic, Cadmium, Mercury, Lead
 Black Cohosh, Hemp*

Human Metabolism Study

Arsenic, Cadmium, Mercury, Lead
 Human Blood

*Study not sponsored by the National Institutes of Health Office of Dietary Supplements.

Water-Soluble Vitamins

Folate is an essential vitamin, critical for the production and maintenance of new cells as well as synthesis of DNA and RNA, and the adequate folate intake during pregnancy is important for the prevention of neural tube defects. Humans obtain folic acid through their diet, via fortified foods and supplements. Other forms of folate occur naturally in some foods. Folate health status is evaluated through determination of folate metabolites in serum.

Dietary Intake Study

Folic Acid, Folates
Multivitamin, Infant Formula

Human Metabolism Study

Folic acid, Folates
Human Serum

Fat-Soluble Vitamins

Carotenoids are thought to provide health benefits in part due to their role as potential antioxidants, in decreasing the risk of certain cancers and eye diseases, and as a source of vitamin A. Dietary sources of carotenoids such as β -carotene, lycopene, lutein, and zeaxanthin include many fruits and vegetables as well as natural and fortified supplements. Adequate intake of fruits and vegetables is often correlated with levels of these carotenoids in plasma and serum.

Dietary Intake Study

Carotenoids
Multivitamin, Saw Palmetto Extract

Human Metabolism Study

Carotenoids
Human Serum, Bovine Serum

Organics in Botanicals

Isoflavones are phytoestrogens commonly consumed in the diet (e.g., soy-containing foods) or through supplementation. Consumption of isoflavone-rich foods has been associated with reduction in rates of postmenopausal cancer, osteoporosis, and hot flashes. When consumed, some isoflavones (daidzein and daidzin) may be converted to equol by intestinal bacteria, which can be detected in the urine. Measurement of isoflavones in foods and supplements, coupled with measurement of equol and unmetabolized daidzein and daidzin in urine, can inform clinical trials interested in determining the efficacy of isoflavones to produce positive health outcomes.

Dietary Intake Study

Isoflavones
Soy, Red Clover

Human Metabolism Study

Daidzein, Daidzin, Equol
Human Urine

Organics in Natural Products

Coenzyme Q10 (CoQ10) is a vitamin-like component found naturally in the human body that helps provide energy to cells as an electron carrier in mitochondrial oxidative phosphorylation to produce ATP. Some clinical studies have shown potential for improvement of heart conditions, migraine headaches, and many other conditions through supplementation of CoQ10, although much evidence is inconclusive. Levels of CoQ10 in serum have been correlated to dietary intake, but a better understanding of laboratory measurement capabilities in both supplements and serum will help clinicians and epidemiologists evaluate the relationship between CoQ10 intake and circulating serum levels and allow for meaningful future intervention studies.

Dietary Intake Study

Ubiquinone
Commercial Dietary Supplements

Human Metabolism Study

Ubiquinone
Human Serum, Bovine Serum

Contaminants

Furans can be formed in heat-treated foods and are known to be carcinogenic to humans. These compounds have recently been added to the California Prop 65 list, so additional testing needs are expected in the near future. The metabolites of furans are typically monitored in the urine and can indicate exposure from diet, tobacco use, or the environment.

Dietary Intake Study

Furans, Alkyl furans
Coffee, Baby Food, Cereal

Human Metabolism Study

Furan Metabolites
Human Urine

Inflammation Markers

Increased plasma concentrations of calprotectin and zonulin have been correlated with increased immune response and increased gut permeability, respectively, but the clinical evidence is difficult to interpret. To facilitate stronger conclusions from future clinical trials, laboratory performance in measurement of these proteins must be understood.

--

Human Metabolism Study

Calprotectin, Zonulin
Human Plasma

Many of the studies for HAMQAP Exercise 3 are supported by the National Institutes of Health, Office of Dietary Supplements (NIH-ODS). As a result, participation in HAMQAP is free of charge, although participants will be required to pay for the cost of sample shipment by providing NIST with a shipping account number using UPS, FedEx (including TNT), and DHL. International participants must provide an import shipping account number, if applicable. Participants responsible for all incurred shipping charges, including those that may result from shipments being returned to NIST because of customs clearance issues. In no cases are participants paid to participate in HAMQAP.

Instructions for sign up for new and existing participants are attached. **The call for participation will close on November 30, 2018, and samples will be distributed by February 15, 2019.**

Please let us know if you have questions. We look forward to your participation in this and future HAMQAP exercises.

Best regards,
HAMQAP Team

Registration Instructions

For New Participants

To participate, first request an account by navigating to <https://qa.nist.gov/hamqap> and clicking *Request new account*. Once your account request is approved, you will receive an automated email with login information. Please modify this password immediately upon logging in to the system, and confirm or update your contact information on the *My account* page. If you have additional users that you wish to give access to your laboratory sign up and participation information (e.g., QC manager, additional analysts), you may also create secondary accounts on the *My account* page. To add your laboratory to the HAMQAP *List of Participants* page, check the box on the *My account* page. *All participants are required to provide shipping account information (e.g., FedEx, UPS, DHL), to which the cost of sample shipment will be charged. Your account will not be approved until a valid shipping account is provided.* Next, log in to your account at <https://qa.nist.gov/hamqap>. Click *Register for Exercise* on the left menu, and select the blue *Details* button next to HAMQAP Exercise 3 – Dietary Intake and/or HAMQAP Exercise 3 – Human Metabolites. Once you have selected the studies of interest, click the blue button for *Participate in this exercise*. Your participation request will be approved by a program administrator, and you will receive an automated confirmation email. Study selections can be modified at any time up to the close of the registration period.

For Existing Participants (DSQAP and/or HAMQAP)

Log in to your account at <https://qa.nist.gov/hamqap>. *Participants in the DSQAP should use existing login credentials, as DSQAP account information was transferred to the HAMQAP site.* Click *Register for Exercise* on the left menu, and select the blue *Details* button next to HAMQAP Exercise 3 – Dietary Intake and/or HAMQAP Exercise 3 – Human Metabolites. Once you have selected the studies of interest, click the blue button for *Participate in this exercise*. Your participation request will be approved by a program administrator, and you will receive an automated confirmation email. Study selections can be modified at any time up to the close of the registration period. *All participants are required to provide shipping account information (e.g., FedEx, UPS, DHL), to which the cost of sample shipment will be charged. Your registration for the exercise will not be accepted until a valid shipping account is provided.* Additional users (e.g., QC manager, additional analysts) can be granted access to your laboratory sign up and participation information on the *My account* page at any time. Your laboratory may be added to the HAMQAP *List of Participants* page at any time by checking the box on the *My account* page.