TRIMETHYLAMINURIA URINE TEST
SPECIMEN COLLECTION INSTRUCTIONS AND PROCEDURES

Trimethylaminuria (TMAU) urine test involves a series of essential steps in order for the test to give accurate results. A TMAU urine test is a “challenge test,” meaning that the symptoms need to be provoked. In order to prevent further potential production of trimethylamine (TMA) by the TMA-producing bacteria in the urine after collection and since TMA becomes gas at room temperature, (http://www.chemistrydaily.com/chemistry/Trimethylamine) it is very important to stabilize the urine immediately upon collection with hydrochloric acid (HCl), which will already have been added to the tubes included in the kit. Please note the special handling of HCl instructions included in the kit and noted below for safety reasons. To further stabilize the specimen, as soon as the first specimen is collected, it must be frozen. It is recommended that the second specimen, if there is one, be collected anytime within a week or two if feasible, following the same handling procedure.

Once all the specimens are collected, they must be shipped to the Eliapharma lab inside the styrofoam container and shipping box with the enclosed ice pack to ensure that it remains frozen. The proper shipping label will be provided by MEBO Research to ensure speedy delivery, and the necessary Customs documentation would have been electronically submitted for you in advance by MEBO Research where applicable. Some countries do not use electronically submitted documents, so MEBO will then email them to you for printing. Please inform MEBO in advance if printing is not possible, and the documents will be mailed/shipped to you or included in your kit. The following is a more detailed explanation of these procedures.

THE KIT CONTENTS:

1. Box with FedEx pouch and return shipping label, Commercial Invoice, and any required papers you might need to sign (not always applicable). All other Custom’s required documentation will have been processed and submitted directly to Customs by MEBO Research electronically whenever possible,
2. Styrofoam box (main part and lid),
3. Two nitrile gloves for safe handling of tube containing hydrochloric acid (HCl),
4. Zip lock bag,
5. Absorbent cloth to wrap around tubes before inserting into the bag to prevent possible leakage,
6. A 50 mL tube to collect the urine,
7. One to six (as per order) 15 mL tubes, with the proper amount of HCl to then add urine up to 10 mL line only,
8. A pipette to collect urine to transfer urine from the larger tube to the smaller tube containing HCl,
9. Ice Pack (CryoGel Colloid Pack).
CHOLINE LOAD PROTOCOL FOR COLLECTING ONLY ONE SAMPLE

Consume foods high in choline for one to two consecutive days prior to collecting the specimen. As noted in NCBI, US National Library of Medicine, National Institutes of Health, GeneReview Bookshelf ID: NBK1103 PMID: 20301282 (http://www.ncbi.nlm.nih.gov/pubmed/20301282), on Trimethylaminuria (http://www.ncbi.nlm.nih.gov/books/NBK1103/), choline is a TMA precursor and is “present in eggs, liver, kidney, peas, beans, peanuts, soya products, and brassicas [Brussels sprouts, broccoli, cabbage, cauliflower]), lecithin and lecithin-containing fish oil supplements…” The USDA Database for Choline Contents of Foods (http://www.ars.usda.gov/SP2UserFiles/Place/12354500/Data/Choline/Choln02.pdf) 2008 has a table beginning on page 12 that lists the breakdown and total choline (Total Cho) content of foods. Another Chart adapted from the USDA Database (http://www.meboresearch.org/Choline%20content%20Foods%20Adapted%20from%20USDA.pdf) lists foods per its choline content, with the foods highest in choline found on page 13.

STEP BY STEP SPECIMEN COLLECTION AND SHIPPING INSTRUCTIONS:

**WARNING:** The tubes enclosed in the test kit for urine collection contain Hydrochloric acid (HCl) to stabilize the sample. Please use caution and use the enclosed acid-resistant gloves to open and manage the tubes to avoid contact with the acid in order to prevent serious burns.

1. **IMPORTANT:** Write your name and date of collection on tube label. It is recommended to keep a diary noting symptoms and protocol used to prepare for test for each tube.
2. Put on nitrile gloves.
3. Take only the larger, 50 mL tube and collect the 1st morning urine catch.
4. Carefully open the smaller 15 mL tube containing HCl and use the pipette to collect urine from the larger tube to the smaller tube. **IT’S VERY IMPORTANT TO FILL SMALLER TUBE WITH URINE ONLY UP TO 10mL. Never pour out excess urine containing HCl because predetermined ratio of urine to HCl would be altered.**
5. Carefully close the specimen tube, wrap it with absorbent, put it in the zip lock bag, do not ship them back to the lab without first storing in the freezer along with the ice pack.
6. After all specimen collections are completed, discard large tube, pipette, and gloves. Please do not ship these three items back.
7. When ready to ship, place only the content in the zip lock bag and the icepack inside the styrofoam box. Put the styrofoam box inside the shipping box and seal with tape.
8. Attach FedEx pouch on the shipping box, fold the return label in half and put it inside the pouch.
9. For faster shipping, take the box to a FedEx office only on Monday, Tuesday, and if necessary, on Wednesday mornings to prevent delays over the weekend. The shipment must arrive in the lab frozen.
10. If you have pre-paid MEBO $2.50 as noted on your invoice, you can ask for FedEx to collect the shipment from your home; if not, you may take it to your nearest Fedex drop-off point.
11. All Customs required documents would have been already submitted electronically by MEBO Research wherever applicable, except those you might need to sign. If you receive Customs documents you need to sign, please place them in the pouch with the return label.
**WOMEN ARE RECOMMENDED** to test a few days prior to their menstruation for their first specimen, since a study done by Drs. Cashman, Shimizu, and Yamazaki indicate that Transient trimethylaminuria can be related to menstruation (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1790885/?tool=pubmed), and any of the specimens may be collected during menstruation with care to not contaminate the sample with vaginal discharge by using a tampon and cleaning the area well.

**NOTE:** Many persons are requesting more than one sample and expressing interest in using different preparation protocols to better understand their own odor triggers. As a result, even though MEBO and the lab, Eliapharma recommend the instructions noted above for the first sample, and those testing with more than one sample can review the procedures followed by other labs (http://www.meboresearch.org/QUANTITATIVE%20TMAU%20URINE%20TEST%20PROTOCOLS%20AND%20RANGES%20OF%20LABS.pdf), as well as testing the theories noted online by experts (discussed below) for the 2nd to the 6th test sample. As many sufferers and experts believe, not all body odor conditions have the same origin. Therefore, testing more than once using various different protocols for each specimen may help the individual understand his or her particular odor triggers, and the collective data of volunteers may be useful in MEBO and Eliapharma’s research goals.

**ADDITIONAL PROTOCOL CONSIDERATIONS FOR QUANTITATIVE TMAU URINE TEST:** The choline content alone of the foods is not the only factor to consider in a TMAU odor-management effort. Instead, the TMA content of the foods as well as the inhibiting effects on FMO3 enzyme activity by certain foods or hormonal changes need to also be taken into account. An attempt is made in a post in MEBO’s blog, Three main protocols of TMAU diet (http://www.bloodbornebodyodorandhalitosis.com/2009/08/three-main-protocols-of-tmau-diet.html), to discuss this question by presenting 3 different points of interest; but in the end, each sufferer will have to ‘test’ their respective saturation levels to determine how much choline and trimethylamine (TMA) can be ingest without the body odors increasing. As sufferers, one also has a choice as to when and how much one is willing to emit body odor in order to enjoy foods every once in a while, and also in an effort to provide the nourishment our bodies need. Please refer to the strategies for the treatment of trimethylaminuria (http://www.ncbi.nlm.nih.gov/books/NBK1103/#trimethylaminuria.Management) [Cashman et al 2003 (http://www.ncbi.nlm.nih.gov/books/NBK1103/#trimethylaminuria.grID97689)] discussed in GeneReviews, US National Library of Medicine, National Institutes of Health, and "best-practice" guidelines [Chalmers et al 2006 (http://www.ncbi.nlm.nih.gov/books/NBK1103/#trimethylaminuria.grID97692)], which break up into three categories the Treatment of Manifestations of body odor produced by TMAU. Persons choosing to do more than one sample for the TMAU Urine Test may consider the following protocol/procedures:
FOR PERSONS COLLECTING MORE THAN ONE SAMPLE

1. **For the first sample:** Following the high choline load **WITHOUT adding** TMA-rich foods seafood (fish, cephalopods, and crustaceans) or brassicas (Brussels sprouts, broccoli, cabbage, and cauliflower) contain indoles, as describe in Gene Reviews, to test the function of the TMA-producing from choline bacteria in the gut, thus indicating a possible Secondary TMAU.

2. **For the second sample:** Consume high Trimethylamine (TMA)-RICH foods, TMA-rich foods seafood (fish, cephalopods, and crustaceans), as well as milk obtained from wheat-fed cows ([http://www.ncbi.nlm.nih.gov/books/NBK1103/](http://www.ncbi.nlm.nih.gov/books/NBK1103)), **WITHOUT overloading with choline or consuming brassicas in order to target the measurement of the FMO3 enzyme functions without the strong influence of the TMA-producing bacteria.**

3. **For the third sample:** Consume as much brassicas as possible in addition to choline and/or TMA rich foods to see if the enzyme is inhibited by brassicas.

Please indicate on the tube label, or on any sheet of paper to enclose in the kit, if you have used any other “challenge” to provoke symptoms or specimen collection procedures for any specimen.

ADDITIONAL NOTES: A few studies have indicated that metabolic inefficiencies may trigger existing conditions such as epilepsy and learning disabilities, such as the studies noted on MEBO’s Blog post, *Epilepsy and Trimethylaminuria* ([http://www.google.com/url?q=http%3A%2F%2Fwww.bloodbornebodyodorandhalitosis.com%2F2010%2F12%2Fepilepsy-and-trimethylaminuria.html&sa=D&sntz=1&usg=AFQjCNGS9J0AyhqvO0NhkYcX8WQskBoVXQ](http://www.google.com/url?q=http%3A%2F%2Fwww.bloodbornebodyodorandhalitosis.com%2F2010%2F12%2Fepilepsy-and-trimethylaminuria.html&sa=D&sntz=1&usg=AFQjCNGS9J0AyhqvO0NhkYcX8WQskBoVXQ)). If by chance you may have these medical conditions, as well as others such as chronic fatigue, autoimmune abnormalities, fibromyalgia, migraines, MS, Autism, etc., you might want to do your urine collection during a flare-up to see if there is any correlation between your TMA levels and the episode.

TEST RESULTS:

Test results will be sent to MEBO Research and will be forward by email provided in the application form. Persons testing are strongly recommended to show positive results to their physician with a copy of this instruction form as well as all the forms recommended in the post in MEBO’s blog entitled, *What to do with a positive TMAU test result* ([http://www.bloodbornebodyodorandhalitosis.com/2011/01/what-to-do-with-positive-tmau-test.html](http://www.bloodbornebodyodorandhalitosis.com/2011/01/what-to-do-with-positive-tmau-test.html)).

Like all other laboratory tests, while specimens are analyzed to clinical TMAU testing standards, they should not be regarded as a final medical diagnosis. The specimens are tested by LC/MS, and the test depicts the amount of trimethylamine, trimethylamine-n-oxide, and creatinine in each sample.

TEST PROCEDURES USED BY OTHER LABS

*(For further informational purposes not necessarily recommended by MEBO or Eliapharma)*
Below is general information on instructions given by other labs on the preparation procedure for the test and on the collection process. Of the few labs that do a Quantitative TMAU Urine Test, there are a few variations of instructions for the test, but all have the same purpose: to make the person as symptomatic as possible at the time of collecting a sample.

The instructions can vary such as:

1. Choline loading: Taking a high choline diet or choline supplement hours before testing, then either collecting a sample at a certain time afterwards (eg, random sample or morning after sample), or collecting all urine for a number of hours and taking a sample from the collected urine and noting the volume collected.

2. Using a trimethylamine capsule rather than any choline to provoke symptoms. This is usually suggested for detecting ‘carriers’ only. It is a straight test of FMO3 capacity, since the TMA was not generated in the gut.

3. Sample collecting: As mentioned in 2, samples are usually taken in 3 ways; random sample, morning catch, or a sample from urine collected over a number of hours (usually notifying the lab of the total urine volume collected as well).