Thank you for initiating your test with MEBO Research, Inc. ("MEBO") through the Cleveland Clinic.

*Please Note: The results are part of a broader research study and indicate the levels of compounds in the urine sample. It is not a medical diagnosis, and should not be considered as such. It is only provided for informational purposes.*

*Please read the accompanying notes below about this service.*

<table>
<thead>
<tr>
<th>Name and ID Number</th>
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</table>

### Your sample results

<table>
<thead>
<tr>
<th></th>
<th>Result</th>
<th>Normal Ranges</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TMA</strong> (umol/mmol creatinine)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TMAO</strong> (umol/mmol creatinine)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Creatinine</strong> (mmol/L)</td>
<td></td>
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</tr>
</tbody>
</table>

**TMA** - trimethylamine | **TMAO** - trimethylamine-n-oxide | TMA and TMAO measured in umol/mmol creatinine | creatinine - measured in mmol/L

From this data we can work out

<table>
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<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TMAO/(TMA + TMAO)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TMA/TMAO ratio</strong></td>
<td></td>
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</tbody>
</table>

### Comments:

**Comments:** You oxidized _% of the TMA

The amount of TMA you were left with was _

*Note: Testing performed at Cleveland Clinic Prevention Research Lab. This is not a medical diagnosis and should not be interpreted as such.*
Additional questions about your results: email tmauresult@meboresearch.org

For general information, included are the reference ranges of other TMAU testing laboratories. Please note there is no international standard reference range, and each reference range will vary and is subject to change by each laboratory.

**Reference ranges of other labs**

<table>
<thead>
<tr>
<th>Lab</th>
<th>Reference ranges</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>TMA - normal &lt;6.8</td>
<td>Does not test TMAO</td>
</tr>
<tr>
<td>HBRI</td>
<td>TMAO/(TMA + TMAO) &gt;95%</td>
<td>Does not consider TMA level alone</td>
</tr>
<tr>
<td>Denver</td>
<td>ratio TMAO/TMA &gt;92%</td>
<td>Does not consider TMA level alone</td>
</tr>
</tbody>
</table>

*Important Accompanying Notes:*

Testing results should not be interpreted as a medical diagnosis. Only a medical doctor can give a diagnosis. The samples were tested to clinical standards by the Cleveland Clinic using Liquid Chromatography/Tandem Mass Spectrometry.

In order to further research at a broader level and provide tools for self help, MEBO will maintain a copy of your test results. All personal information will remain private. MEBO may make available your test result figures, withholding any names, publicly on its website or blogs. If you do not want MEBO to maintain a record of these test results, please contact tmauresult@meboresearch.org.

If you are further interested in the genetic mutants/variants associated with TMAU, there are TMAU DNA tests available.

**Notes about Trimethylaminuria (TMAU)**

TMA is converted to TMA-oxide (TMAO) by the FMO3 enzyme (mostly situated in the liver). TMA is odorous, whereas TMA-oxide is not.

**Primary TMAU (TMAU1):** defined as being caused by a FMO3 deficiency, usually genetic. Typical pattern is a higher than normal TMA level and lower TMAO level. TMAO output is less than 80% of total TMA presented to the FMO3 enzyme (TMA + TMAO), in other words ratio of TMA/TMAO is higher than 0.21. TMAU1 is generally regarded as the inability to convert normal levels of TMA to TMAO (FMO3 deficiency).

**Secondary TMAU (TMAU 2):** defined as being a raised TMA level when the TMAO level does not seem low in comparison. Typical pattern is above normal TMA and increased TMAO, with TMA/(TMAO + TMA) still being above 81%. Most labs do not seem to take TMAU2 into consideration (i.e. not calculated).

TMAU2 is regarded as being an excess of TMA being presented to the liver, with normal levels of TMAO produced (substrate overload). Raised TMA levels is often regarded as being produced by bacterial overgrowth in the gut.

**How might trimethylaminuria be treated:**

Although there is no cure for trimethylaminuria, it is possible for people with this condition to live normal, healthy lives. Strategies for the treatment of trimethylaminuria covered in detail in Cashman et al [2003] [3], and in “best-practice” guidelines [1]. Dr. Ian Phillips and Eileen Shephard recommend a treatment plan to reduce symptoms [11], as noted in the National Institutes of Health, Office of Rare Diseases Research, article, *Trimethylaminuria*. 
Additional TMAU Information


Suggested Reading