PATHLAB INTEGRATIVE MEDICINE

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SUMMARY

- Ensure that your lab tests for mauve factor
- Mauve was identified in the urine of some mental-health patients
- Carl Pfeiffer first developed the calorimetric test for mauve
- Mauve is not kryptopyrrole but hydroxyhaemopyrrolin-2-one (HPL)
- Mauve factor causes deficits in zinc and vitamins B6 and B3
- Treatment may require aggressive supplementation with zinc citrate and both B6 and pyridoxal-5-phosphate
- AA and/or EPA and DHA may be low in persons with mauve factor
- Testing red blood-cell EFA helps titrate AA, EPA and EPO
- Red blood-cell zinc (not serum zinc) is essential for monitoring zinc levels

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Kryptopyrrole or mauve?

The test for a key metabolite in functional medicine is best described as having a mauve hue, argues Jacques Duff**.**

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Abram Hoffer *et al* reported discovering 'mauve factor', or 'mauve' for short, in the urine of psychiatric patients as early as 1958. Mauve got its name from its distinctive mauve colour when developed on paper chromatograms. When the substance was first identified, Hoffer named the condition, characterised by large amounts of mauve, malvaria.[1]

In 1969, Donald Irvine published that his group had extracted mauve from urine, naming it kryptopyrrole.[2] This was the first time that mauve was erroneously identified as kryptopyrrole. In 1970, Sohler made the same mistake, re-identifying mauve as 2,4-dimethyl-3-ethyl pyrrole (kryptopyrrole).[3]

A number of research papers were subsequently published that investigated the usefulness of kryptopyrroles as a marker for schizophrenia and its negative effects on

the behaviour of lab rats with mixed results, thereby confounding or contradicting the original findings of Hoffer.[4–8]

In 1974, Sohler and the Pfeiffer group introduced a colorimetric quantitative assay for mauve, which utilised kryptopyrrole as standard.[9] Although the structural similarity of mauve and kryptopyrrole may have justifed the use of kryptopyrole as a standard for mauve assay, the two molecules are distinctly different, as seen in the diagram [right].

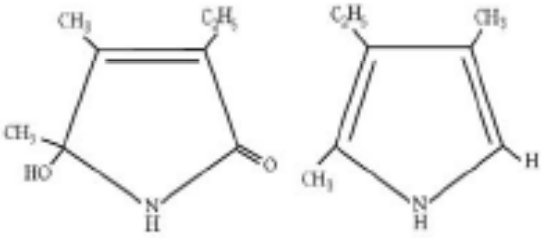
It was not until 1978 that it was discovered that kryptopyrole was not found in the urine of schizophrenic people or normal controls.[10] In the same year, Wooldridge identified mauve as oxidised haemopyrrole by synthesis[11], and Irving confirmed, by synthesis, the structure of Mauve as hydroxyhaemopyrrolin-2-one (HPL), the hydroxylactam of haemopyrrole and not kryptopyrrole. Consequently, the use of the term 'pyrroluria' ought not be used to refer to mauve factor, as it does not refer specifically to HPL.

Lab tests and stability of mauve

HPL is unstable in urine samples, readily interacting with other compounds, including acids, and is degraded by exposure to light and heat. One study reported the half-life of HPL in urine samples at room temperature as around 10 to 12 hours, but no mention of light exposure was made.

In Australia, Pathlab (Burwood, Victoria) tests for kryptopyrrole and not HPL, although they have recently incorrectly relabelled the test as testing for mauve factor.[12] SAFE Laboratories (Burleigh Junction, Queensland) does test for HPL using an adapted calorimetric method for our warmer climate based on the assay originally designed by Pfieffer. Brett Lambert at SAFE Laboratory has indicated that they found in their quality testing that HPL in urine samples stored in a refrigerator tends to degenerate rapidly over days[13], and that HPL is very unstable at room temperature.

Pathlab uses vitamin C as a preservative, protects samples from light with aluminium foil and recommends collection in a dim room. However, since samples are mailed to the lab by patients, there is no control over how long the sample has travelled or what temperatures the samples may have been exposed to during transportation. SAFE Laboratories has specific collection at pathology labs in most states, where the sample is collected under dim light, vitamin C is added and the sample wrapped in foil and liquid nitrogen for transport.



Woody McGinnis and a number of biochemists from laboratories in the US and Europe reported more extensively on laboratory procedures, and the interested reader should read their more extensive papers.[14,15] Overall, they reported that all labs contacted for the writing of their paper used vitamin C as a preservative and froze the light-protected samples for transportation.

Treatment of mauve factor

Hoffer gave patients with schizophrenia 1g of vitamin B3 with each meal and observed that remission of symptoms was associated with the disappearance of Mauve from the urine, and that Mauve reappeared with symptom regression. Pfieffer reported a similar effect using zinc and vitamin B6 supplementation.[16] This is no surprise, as pyridoxine (vitamin B6) is essential for the conversion of tryptophan to nicotinamide adenine dinucleotide (NAD), the vitamin B3 coenzyme. With a deficiency of pyridoxine, the synthesis of NAD is impaired, leading to a form of pellagra, caused by vitamin B3 deficiency.

Anecdotal reports on the web have suggested that 'pyrolurics' should not be given fish oils as it can precipitate a worsening of symptoms. In our extensive experience (over 800 patients to date) in testing red-cell zinc and red-cell essential fatty acids of children and adults with disruptive and/or psychotic behaviours, pyroluria is associated with chronically very low red-cell zinc, and often very low docosahexaenoic acid (DHA) and/or arachidonic acid (AA). Note that zinc is an essential cofactor of delta-6-desaturase needed for converting alpha–linolenic acid and linoleic acid to AA and eicosapentaenoic acid (EPA) respectively. Since EPA suppresses the action of AA, supplementation with high-EPA fish oils suppresses AA and may cause a disruption in the structure of cell membranes subserved by AA. Hence a red-cell essential fatty acids analysis [see *JCM* 2008;7(3):41–2] is recommended prior to commencing fish oils as part of a therapeutic program. ◗

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