



ESTROGEN METABOLISM RATIO

Accession Number: 9779

Provider:
 Rocky Mountain Analytical
 Unit A 253147 Bears paw Road NW
 Calgary AB T3L 2P5

Client:
 Jane Doe

 (403) 555-1234

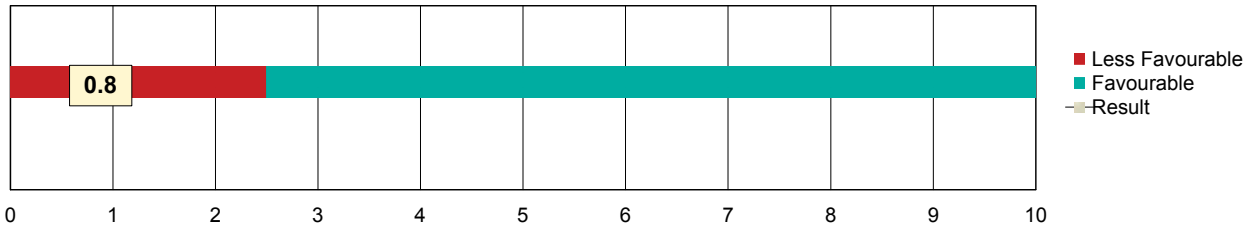
Age: 44
DOB: 1960/7/6
Gender: Female
Status: Hysterectomy

Health #: 111111111

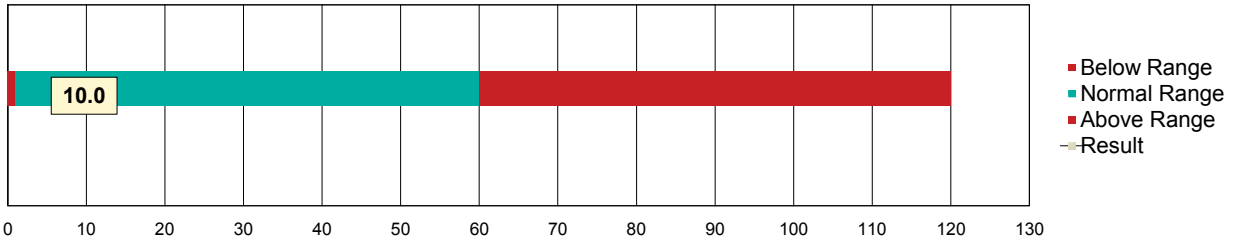
Phone:
 Fax:

Hormone	Status	Result	Range	Units	Range Applied
2-hydroxyestrogen	Within range	8.2	1.0 - 60	ng/ml	Female: all ages
16-hydroxyestrone	Within range	10	1.0 - 60	ng/ml	Female: all ages
Estrogen Metabolism Ratio		0.8	See Interpretation		

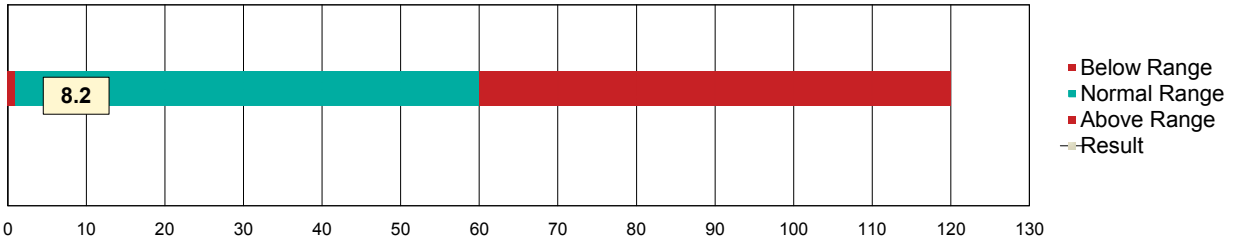
Estrogen Metabolism Ratio



16-hydroxyestrone



2-hydroxyestrogen



George Gillson
 George Gillson MD, PhD
 Medical Director

Co-Signing Physician:
 Clare Westmacott, MD
 Canmore, AB
 Phone: (403) 678 2737

Both estrogen metabolites are within normal limits.

The Estrogen Metabolism Ratio looks at how estrogens are broken down by the body. Two of the metabolites (breakdown products) of estrogen are 16-alpha-hydroxyestrone (16- α -OHE1) and the 2-hydroxyestrogens (2-OHE). A proper balance between these two metabolites is important to maintaining good health. 16-alpha-hydroxyestrone (16- α -OHE1) is a more potent estrogen and may therefore promote growth of hormone dependent cancers like breast cancer. Conversely, there is some evidence that the weaker major urinary metabolite of estrogen, 2-OHE1, is *protective* against breast cancer. Therefore, determining the ratio of 2-OHE to 16-OHE1 may give an indication of breast cancer risk. Studies suggest that an Estrogen Metabolism Ratio (EMR) of greater than 2.0 is associated with decreased breast cancer risk in both pre- and post-menopausal women. Several retrospective case-control studies have demonstrated that the EMR is lower in both pre- and postmenopausal women diagnosed with breast cancer, compared to disease-free, age-matched controls [1-3]. A lower EMR is most often associated with decreased urinary excretion of 2-hydroxyestrone, the principal urinary estrogen metabolite. Several prospective case-control studies have examined the relationship between EMR and future risk of breast cancer. Estrogen Metabolism Ratios were measured in frozen urine specimens obtained at the inception of a large observational study of women on the Isle of Guernsey [4]. The findings were as follows:

Postmenopausal Women

After more than 16 years of follow-up, a baseline EMR of greater than 2.1 resulted in a 30% decrease in the risk of breast cancer in post-menopausal women compared to those whose EMR was less than 1.4 at baseline.[4]

Pre-Menopausal Women

Again after 16 years of follow-up, a baseline EMR of greater than 2.4 resulted in a 30% decrease in the risk of breast cancer in pre-menopausal women compared to those whose EMR was less than 1.8 at baseline.4 A study by Muti 5 confirmed Meilahn's findings for premenopausal women.

These studies suggest that maintaining a minimum EMR of between 2.0 and 2.4 through premenopause and into postmenopause may modestly reduce the risk of breast cancer.

Raising the Estrogen Metabolism Ratio

It is important to note that there are no interventional trials that have prospectively examined the effect of raising a low EMR. Therefore, even though the natural products listed below help increase the EMR (primarily through increased excretion of 2-hydroxyestrone relative to 16 α -hydroxyestrone), to date there is no proof that increasing the ratio in adult women now will reduce their breast cancer risk later.

Cruciferous vegetables [6]
 Indole-3-carbinol [7]
 Di-indolylmethane [8]
 Flaxseed [9]
 Omega-3 fatty acids [10]
 Thyroxine [11]

Progesterone [12]
 Oil of Rosemary [13]
 Soy isoflavones [14]
 Decreased saturated fat intake [15]
 Increased fibre intake [16]

References 6 to 16 found in the RMA Resource Manual.

Monitoring of the Estrogen Metabolism Ratio

Treatment decisions should be based on an assessment of the Estrogen Metabolism Ratio itself, rather than on the concentrations of the component urinary estrogens (2-OHE and 16-OHE1). In any given patient, across-time comparison of the concentrations of the component estrogens is not recommended. For premenopausal women, the absolute amount of estrogens excreted can vary widely throughout the menstrual cycle, and from patient to patient. The assay itself also has certain limitations. For example, sample dilution is necessary in some cases. Dilution has little impact on the Ratio, but increases the apparent concentrations of the individual estrogens. Also, the concentration of estrogens in the specimen is a function of the hydration status of the patient, whereas the EMR is not sensitive to this factor. Apparent estrogen concentrations can also vary somewhat across different kit lot numbers, whereas the EMR is more stable across time. Again, clinical decisions should be made on the ratio, not the absolute levels of the component estrogens.

References

1. Kabat GC, Jen Chang C, Sparano JA, et al. Urinary estrogen metabolites and breast cancer: A case-control study. *Cancer Epidemiol Biomarkers Prev* 1997;6:505-509.
2. Ho GH, Luo XW, Ji CY, et al. Urinary 2/16 α -hydroxyestrone ratio: Correlation with serum insulin-like growth factor binding protein-3 and a potential biomarker of breast cancer risk. *Ann Acad Med Singapore* 1998;27:294-299.
3. Coker AL, Crane MM, Sticca RP, Sepkovic DW. Re: Ethnic differences in estrogen metabolism in healthy women. *J Natl Cancer Inst* 1997;89:89.
4. Meilahn EN, De Stavola B, Allen DS, et al. Do urinary oestrogen metabolites breast cancer? Guernsey III cohort follow-up. *British J Cancer* 1998;78:1250-1255.
5. Muti P, Bradlow HL, Micheli A, et al. Estrogen metabolism and risk of breast cancer: a prospective study of the 2:16 alpha-hydroxyestrone ratio in premenopausal and postmenopausal women. *Epidemiology* 2000;11:635-640.



George Gillson MD, PhD
Medical Director

Note: The College of Physicians and Surgeons of Alberta considers urinary 2:16 hydroxyestrone testing to be complementary medicine. The interpretation comments have not been evaluated or approved by any regulatory body. Commentary is provided to clinicians for educational purposes and should not be interpreted as diagnostic or treatment recommendations.