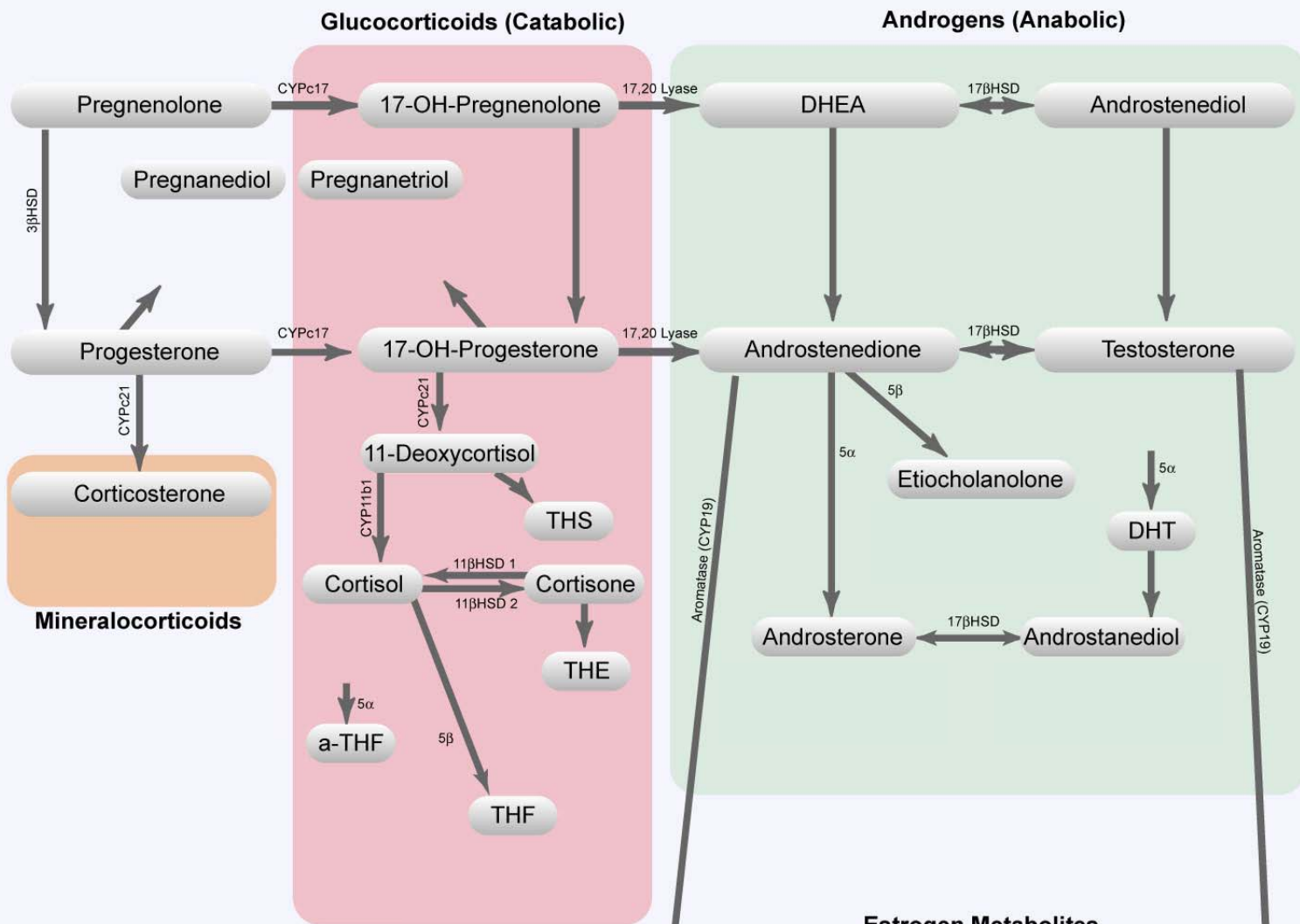




63 Zillicoa Street  
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# Essential Estrogens

## Steroidogenic Pathway At-A-Glance



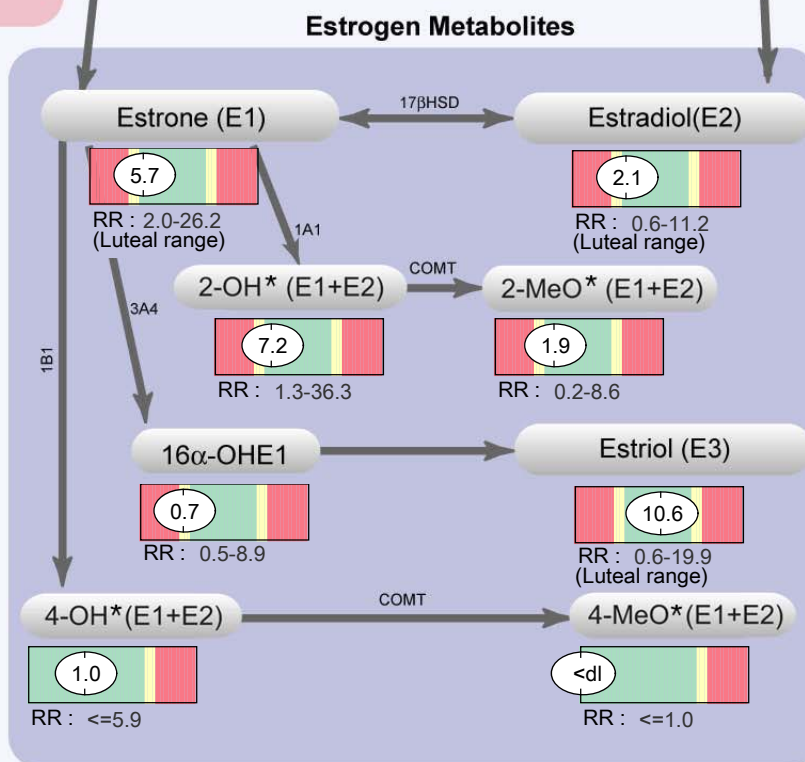
### ENZYMATIC STEPS:

3βHSD = 3beta-Hydroxysteroid dehydrogenase  
 5α = 5alpha-Reductase  
 5β = 5beta-Reductase  
 CYP11b1 = 11beta-Hydroxylase  
 11βHSD = 11beta-Hydroxysteroid dehydrogenase  
 17βHSD = 17beta-Hydroxysteroid dehydrogenase  
 17,20 Lyase = 17,20 Desmolase  
 CYPc17 = 17alpha-Hydroxylase  
 CYP19 = Aromatase  
 CYP21 = 21-Hydroxylase

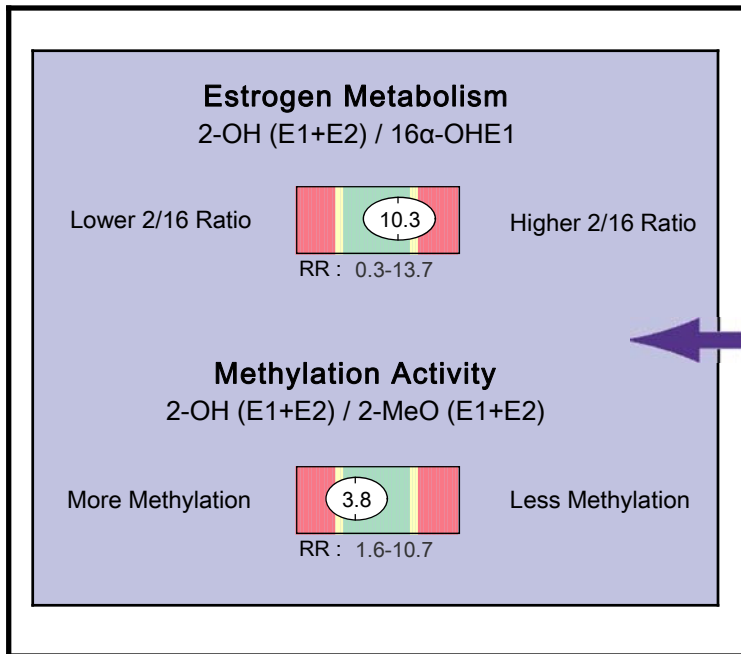
### ESTROGEN METABOLISM:

1A1 = Cytochrome p450 1A1 (CYP1A1)  
 3A4 = Cytochrome p450 3A4 (CYP3A4)  
 1B1 = Cytochrome p450 1B1 (CYP1B1)  
 COMT = Catechol-O-Methyltransferase

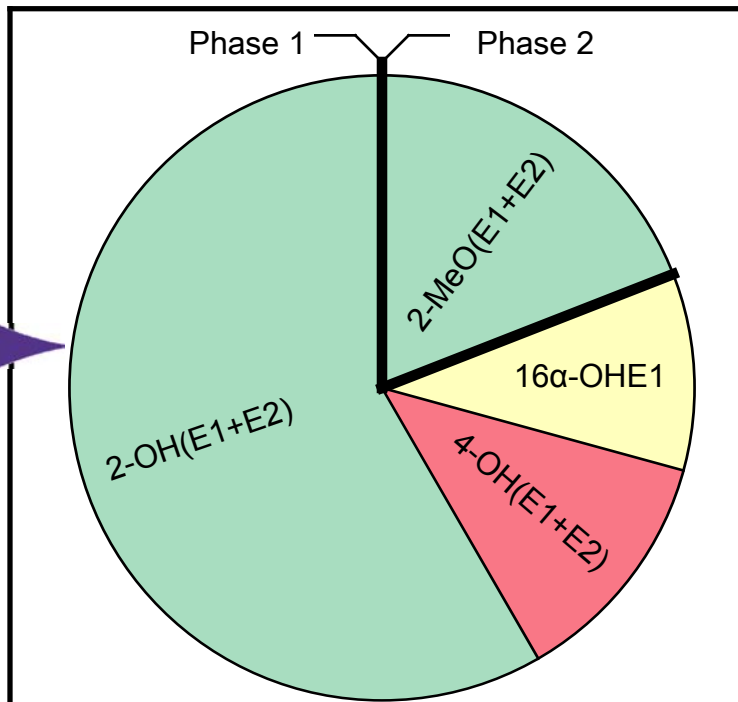
**KEY** \*OH = Hydroxy  
 \*MeO = Methoxy



### Enzymatic Activity



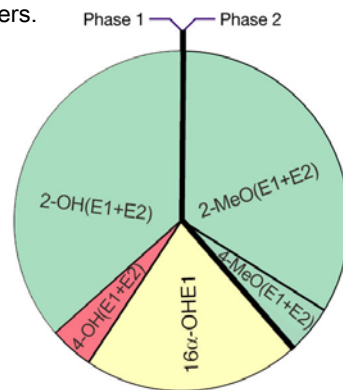
### Estrogen Metabolism



Estrogen metabolite values <DL cannot be depicted in the pie-chart.

This sample pie-chart reflects current scientific understanding of the association of specific estrogen metabolites with disease risk for hormone related cancers.

Metabolites in green have been associated in the literature with decreased risk; those in red, with increased risk. 16-OHE1 (in yellow) has mixed findings, some studies showing an association and many finding no association. The dark line separates Phase 1 and Phase 2 detoxification pathways.



### Key

Methodology: LC-MS/MS; Specimen: 24hr urine; Results normalized to creatinine

## Estrogens

### Estrogens

### Reference Range

Estrone (E1)\*

5.7

2.0-26.2 mcg/g Creat.

\*Premenopause (luteal) reference range shown

Reference Ranges	
Premenopause	2.0-26.2 mcg/g Creat.
Menopause	1.1-26.2 mcg/g Creat.
Male	1.6-8.6 mcg/g Creat.

Estradiol (E2)\*

2.1

0.6-11.2 mcg/g Creat.

\* Premenopause (luteal) reference range shown

Reference Ranges	
Premenopause	0.6-11.2 mcg/g Creat.
Menopause	0.6-15.4 mcg/g Creat.
Male	0.8-4.3 mcg/g Creat.

Estriol (E3)\*

10.6

0.6-19.9 mcg/g Creat.


\* Premenopause (luteal) reference range shown

Reference Ranges	
Premenopause	0.6-19.9 mcg/g Creat.
Menopause	0.7-30.8 mcg/g Creat.
Male	0.3-5.1 mcg/g Creat.

## Estrogens

### Estrogen Metabolites

### Reference Range

2-Hydroxyestrone + 2-Hydroxyestradiol [2-OH(E1+E2)] *	 7.2	1.3-36.3 mcg/g Creat.
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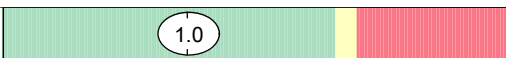
\* Premenopause (luteal) reference range shown

Reference Ranges	
Premenopause	1.3-36.3 mcg/g Creat.
Menopause	0.9-43.8 mcg/g Creat.
Male	0.7-12.5 mcg/g Creat.

16 $\alpha$ -Hydroxyestrone (16 $\alpha$ -OH E1)*	 0.7	0.5-8.9 mcg/g Creat.
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\* Premenopause (luteal) reference range shown

Reference Ranges	
Premenopause	0.5-8.9 mcg/g Creat.
Menopause	0.4-7.7 mcg/g Creat.
Male	<=2.0 mcg/g Creat.

4-Hydroxyestrone+4-Hydroxyestradiol [4-OH(E1+E2)] *	 1.0	<= 5.9 mcg/g Creat.
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\* Premenopause (luteal) reference range shown

Reference Ranges	
Premenopause	<=5.9 mcg/g Creat.
Menopause	<=8.8 mcg/g Creat.
Male	<=1.6 mcg/g Creat.

2-Methoxyestrone+2-Methoxyestradiol [2MeO(E1+E2)]*	 1.9	0.2-8.6 mcg/g Creat.
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\* Premenopause (luteal) reference range shown


Reference Ranges	
Premenopause	0.2-8.6 mcg/g Creat.
Menopause	0.3-5.9 mcg/g Creat.
Male	0.2-2.5 mcg/g Creat.

4-Methoxyestrone+4-Methoxyestradiol [4MeO(E1+E2)]*	 <dl	<= 1.0 mcg/g Creat.
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\* Premenopause (luteal) reference range shown

Reference Ranges	
Premenopause	<=1.0 mcg/g Creat.
Menopause	<=1.0 mcg/g Creat.
Male	<=1.0 mcg/g Creat.

### Ratios

2-OH(E1+E2) / 16 $\alpha$ -OHE1*	 10.3	0.3-13.7
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\* Premenopause (luteal) reference range shown

Reference Ranges	
Premenopause	0.3-13.7
Menopause	0.3-15.1
Male	0.8-12.9

2-OH(E1+E2) / 2-MeO(E1+E2)*	 3.8	1.6-10.7
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\* Premenopause (luteal) reference range shown

Reference Ranges	
Premenopause	1.6-10.7
Menopause	0.4-11.6
Male	1.0-8.8

### *Lab Comments*

The performance characteristics of all assays have been verified by Genova Diagnostics, Inc. Unless otherwise noted with ♦, the assay has not been cleared by the U.S. Food and Drug Administration.

<dl = Unable to calculate results due to less than detectable levels of analyte.