The Basics of Hormone Testing

Compare the pros and cons of serum, saliva, 24-hr urine and **dutch** testing with and without HRT.

	Strengths	Weaknesses	Effective HRT Monitoring	Limited HRT Monitoring	Not Recommended
Serum	Serum testing is reliable and well-suited for testing reproductive hormones. While it does not include metabolites, serum testing for "total" and "free" E2, T, and Pg is the gold standard (if not on HRT).	The testing of cortisol does not include the daily free pattern or metabolites. While testing sex hormones is effective, there are limited metabolites available.	Oral estrogens and DHEA as well as hormone patches, pellets and injections are monitored well.	Hormones applied to mucosal membranes (i.e. vaginal) are difficult due to unpredictable peaks and valleys.	Sublingual hormones as well as oral Pg can lead to highly misleading results. Be careful not to overdose when using transdermal products.
Saliva	The benefit of measuring free cortisol throughout the day is well documented. Saliva's best use is in testing Pg and E2 throughout the menstrual cycle. Accurate and adequately sensitive salivary testing can be useful for identifying ovulatory estrogen and luteal progesterone peaks.	Accuracy for estrogens is not adequate for proper differentiation of pre and postmenopausal women (compared to serum/urine). The benefit of measuring free cortisol is undermined by the lack of cortisol metabolite measurements.	Oral estrogens and DHEA as well as hormone patches and injections are monitored well if the lab quality is of high caliber.	Hormones applied to mucosal membranes (i.e. vaginal) are difficult due to unpredictable peaks and valleys.	Sublingual hormones and oral Pg should not be tested. While it is popular to monitor transdermal hormones with saliva testing, this is not recommended (see comments on reverse side).
24hr Urine	Urine testing, when done well, is an accurate method for assessing reproductive hormones. See note on ***Testosterone Testing.** The inclusion of metabolites offers additional information that is not available in serum or saliva.	Adrenal testing lacks the daily free cortisol pattern. Many labs test "total" cortisol, not "free." All urine ***Testosterone Testing** can show falsely low results if a genetic defect in metabolism exists. It is more prevalent in those of Asian descent. **dutch** testing includes extra metabolites to identify when this occurs.	Hormone patches, pellets and injections are monitored well.	When hormones are swallowed results are artificially increased due to 1st-pass metabolism. The timing and manner of collection must be carefully considered. Skip oral estrogens, DHEA the day of testing. If any sublingual hormone is swallowed, results are of limited value.	Oral Pg requires additional metabolites than usually offered. Vaginal hormones often contaminate samples.
dutch Uniquely comprehensive testing with the easiest patient collection. Increased clinical utility for cortisol testing by providing the daily free pattern and metabolites. Extensive estrogen and androgen metabolites.	Not appropriate for those with abnormal creatinine excretion (kidney issues). Same as above for urine ***Testosterone Testing.** Click here to see a video to explain this complex hormone testing issue.	Works uniquely well for oral Pg (additional metabolites) and vaginal hormones (special method to remove contaminating hormone). Works well for hormone patches, pellets and injections.	As above for 24hr Urine. When hormones are taken by mouth and are swallowed, E2 and T may be artificially increased due to 1st-pass metabolism. In these cases, the test is used for evaluating metabolism patterns, but is of limited use (or sometimes no use) for monitoring the dose.	Recommended for monitoring metabolism patterns but NOT appropriate hormone dosages for oral estrogens and most sublingual hormones.

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What about transdermal creams?
See comments on the reverse side for clarity on this controversial issue.

Testing Matrix & Video Tutorials

For Optimal Hormone Monitoring

Good Effective Options

Not Ideal, Use with Caution

⚠ Not Recommended

T = Testosterone E2 = Estradiol Pg = Progesterone

	Baseline Testing (no HRT)		With Hormone Replacement					
	Sex Hormone	**Adrenal**	**Oral Pg**	**Oral Estrogen**	**Vaginal/Anal**	**Patches, Pellets Injections**	**Sublingual**	**Transdermal (skin) Creams/Gels**
Serum	Well accepted and reliable FDA-cleared methods, but limited metabolites offered.	Lacking the daily (diurnal) free cortisol pattern as well as metabolites.	Actual Pg values do not increase to premenopausal levels and return to baseline quickly. Metabolites can cause falsely elevated values. Lab values may increase with dosages but are not clinically meaningful. ⚠	The return to baseline is much slower than with Pg. Effective for estrogens and DHEA.	Rise and fall is unpredictable, so timing the testing well is difficult.	Serum is well-suited for testing with these forms of HRT.	Results return close to baseline too fast for reliable testing (<3hrs). ⚠	Monitoring transdermal hormones is contraversial and not entirely clear. Generally, salivary values increase dramatically more than serum or urine, especially for progesterone. Saliva testing is not effective for monitoring therapy as values: • Often differ more than 5-fold from one day to the next • Do not appear to reflect systemic exposure • Can remain elevated for more than 6 months after the cessation of therapy (with Pg) Given the elevated salivary values, serum/urine may under-represent some tissue exposure, and providers should use caution to avoid overdosing. E2 increases urine/serum levels to a higher degree than Pg, while the opposite is true in saliva. It is not entirely clear what Pg/E2 ratio is needed in order to protect the endometrium. Serum and urine are more consistently increased with some application techniques, and we continue to research this topic. While adjusting dosing is complicated with any test, urine testing also allows the testing of metabolite patterns.
Saliva	E2 in particular is difficult to measure in saliva. Levels of E2 are 1000x less than in urine and accuracy is highly method-dependent*	Lacking cortisol metabolites, the gold-standard for assessing total cortisol production.	Likely less accurate than serum due to general analytical difficulty*		Rise and fall is unpredictable, so timing is difficult. Saliva not proven for this ROA. ⚠	Likely less accurate than serum/urine due to general analytical difficulty*	Contamination of the mouth lasts far longer than the systemic hormone increase. ⚠	
24hr Urine	Results highly dependent on lab quality. Quality results are accurate and include metabolites.	Lacking the daily (diurnal) free cortisol pattern.	Not effective unless testing includes active (alpha) metabolites. ⚠	Adjusting dosing using urine testing is difficult because of 1st-pass metabolism that leads to increased levels from hormone that has not been in circulation as "free" hormone. **Great for monitoring metabolism.**	Works for Pg, E2, T are likely contaminated. ⚠	A very good option. Metabolites expand the clinical picture.	Adjusting dosing using urine testing is very difficult because of 1st-pass metabolism of any hormone swallowed.	
dutch	Accurate testing that includes metabolites with an easy collection.	IDEAL OPTION Diurnal Free Cortisol Pattern AND Metabolized Cortisol along with Melatonin	Inactive (beta) and active (alpha) metabolites tested for more useful information.		Special method removes free hormone contamination. Some local phase II metabolism may increase E2/E3 levels.	A very good option. Metabolites expand the clinical picture.	**Great for monitoring metabolism patterns.** ⚠	

Best Practices for HRT Monitoring

Oral Pg	Oral Estrogen	Vaginal/Anal	Patch, Pellets Injections	Sublingual
Most lab testing is of marginal value. **dutch** metabolites can offer insight into dosing.	Serum is best for adjusting dosages. **dutch** can be used to include metabolites.	Only **dutch** avoids contamination and offers metabolites.	**dutch** offers the most information. Any test can be effective.	Use caution when monitoring dosing. Use **dutch** testing for metabolites.

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