

**Biomarkers -- practical, at a reasonable cost**

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[www.AgingIntervention.org/1\\_BiomarkerPersonalPracticalBasicList.pdf](http://www.AgingIntervention.org/1_BiomarkerPersonalPracticalBasicList.pdf)

**Last updated Nov 29 2018. Constantly improved.**

**This is what I do. May vary depending on therapy.**

**I have found these to be practical and reasonably priced for my own self-directed age management program and for the use of others.**

**This list is not perfect. I don't claim to know it all, or even very much.**

**CONTACT ME with your improvements and any corrections.**

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**Friendly disclaimer: It's not my intention to provide specific medical advice but rather to provide others with information to better understand their health. This is not medical advice including diagnosis and treatment. Always seek the advice of a trained health professional for medical advice, diagnosis or treatment.**

**In Summary, list of types of tests I believe are most important.**

**May vary depending on therapy.**

- **Safety -- MOST important**
- **DNA methylation (DNAm)**
- **If I HAD to choose just one measure other than safety, DNAm would be it.**
- **Fortunately we have others so that's not necessary.**
- **Inflammation**
- **Mental / Cognitive**
- **Physiological – grip strength, measures of stamina etc.**
- **Subjective / self assessment**

**Worth consideration, require expert interpretation:**

- **Immune**
- **Endocrine**

**Others are below**

There are comprehensive biomarker systems consisting of a great number of tests. Questions and problems can arise with increased complexity, like

- The logistics of doing a large number of tests.
- Costs of a large number of tests. Costs add up.
- Will the phlebotomy lab or mobile phlebotomist be able to handle it?
- What is the published – and real – error of the tests? (I've seen 50% error between replicates from an advanced state-of-the-art lab)
  - o Will you need to do replicates (2 or 3) or multiple days to get desired accuracy?
- Will the test be available in the future?
- Do you get expert interpretation of the tests?
  - o Will interpretation, or the same interpretation, be available in the future?
- Will the test change in the future, making for difficult comparisons? One example is reliance on Illumina chips, which have had upgrades resulting in modifying or upgrading the panel so apples to oranges comparisons.
- Be prepared to have to deal with managing the data.
  - o Consider the practicality of sophisticated online systems
- Will data management systems be available in the future?
  - o Will costs increase, will the design change, how will that affect interpretation

If you have complex testing, also having standard, simple lab tests done for ongoing comparison over the years might be a good idea.

A rather large, not particularly well organized biomarker list collected over the years is also at

[www.aginginterventionfoundation.org/1\\_BiomarkersOfAgingAndHealthMeasures\\_AllInfo.pdf](http://www.aginginterventionfoundation.org/1_BiomarkersOfAgingAndHealthMeasures_AllInfo.pdf)

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**Types – from James Kirkland presentation at IAGG/GSA conference 2017**

Dosing and pharmacokinetics biomarkers  
Pharmacodynamic biomarkers  
Mechanism biomarkers  
Surrogate endpoint biomarkers

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**Life Extension (LEF) blood tests – doctor's order not needed, probably not covered by insurance (but you can try).**

[www.lifeextension.com/Vitamins-Supplements/Blood-Tests/Blood-Tests](http://www.lifeextension.com/Vitamins-Supplements/Blood-Tests/Blood-Tests) 1-800-678-8989

I list them because I have found them easy to use with very good customer support. Others experience varies.

They have a new aging panel to be released soon.

Others:

WellnessFX [www.wellnessfx.com](http://www.wellnessfx.com)

LabsMD [www.labsmd.com](http://www.labsmd.com)

Kiosk Labs [www.koslabs.net](http://www.koslabs.net)

Walk In Lab NOTE: I had a problem clicking on this. You may have to type it in your browser.  
[www.walkinlab.com](http://www.walkinlab.com)  
Google around for others.

**Main labs are Quest and LabCorp. They're similar, but methods, reference ranges etc. are different and not exactly comparable, so suggest standardizing on LabCorp.**

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**Age Management Blood Test Panel**  
[www.lifeextension.com/INE801E](http://www.lifeextension.com/INE801E)

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**Some categories and a few details**  
**SAFETY -- By far the most important.**

Like liver, kidney, blood, lipids, cerebrovascular, and others.

### **Complete Blood Count With Differential**

**This is a basic test for any therapy**

**From LEF – doctor's order not required** [www.lifeextension.com/Vitamins-Supplements/itemLC381822/Chemistry-Panel-Complete-Blood-Count-CBC-Blood-Test](http://www.lifeextension.com/Vitamins-Supplements/itemLC381822/Chemistry-Panel-Complete-Blood-Count-CBC-Blood-Test)

Description from the web site: A comprehensive metabolic panel (CMP) is a blood test that measures your sugar level, electrolyte and fluid balance, plus kidney and liver function. Our CBC/chemistry profile also includes a lipid panel and complete blood count (CBC) so you have the opportunity to detect signs of heart disease, anemia, clotting, and immune disorders, as well as metabolic conditions that could threaten your health.

LEF instructions say

This test may be done fasting (note from Johnny: that's about 12 hr) or 2-6 hours after eating.

Both ways provide valuable information, though 2-6 hours after a meal provides a more realistic assessment of the state of your blood in everyday life. Stay hydrated and take your medications as prescribed.

**From LabCorp directly – with doctor's order, insurance may cover** TEST 005009 CPT:

85025 <https://www.labcorp.com/test-menu/23041/complete-blood-count-cbc-with-differential>

Description from the web site: To determine your general health status; to screen for, diagnose, or monitor any one of a variety of diseases and conditions that affect blood cells, such as anemia, infection, inflammation, bleeding disorder or cancer.

### **INFLAMMATION – an effect and cause of aging**

**Note: Chronic measures of inflammation are highly important.**

As of 11/24/18 CRP, IL-6, TNF-alpha are beginning to be considered somewhat transient measures, and questions raised as to their validity as chronic measures.

**Research is being conducted into whether measures like**

**CXCL9 (Chemokine (C-X-C motif) ligand 9) = MIG (Monokine induced by gamma interferon), TRAIL, IFNG (Interferon gamma), EOTAXIN, GROA and some others are better long term measures, and how they can be measured.**

**Stay tuned.**

C-Reactive Protein (CRP) – has been considered the most useful and reliable measure of inflammation

Fibrinogen

RANTES (T-Cell Specific Protein)

IL-6 (Do IL-6 measurements in the morning as there's a trough in the morning, peak in the afternoon)

TNF-alpha

Other advanced

Haptoglobin

IL-10, IL-17, TNF tumor necrosis factor

Cystatin?

Top level inflammation biomarkers: Myriad RBM InflammationMAP

And do complete blood test and metabolic panel

**Note: Myriad is state-of-the-art, but some of these can have high variations. Replicates are suggested.**

[www.myriadrbm.com/products-services/humanmap-services/inflammationmap](http://www.myriadrbm.com/products-services/humanmap-services/inflammationmap)

Others

[www.myriadrbm.com/products-services/humanmap-services](http://www.myriadrbm.com/products-services/humanmap-services)

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**Some “basic” inflammation biomarkers on a budget**

C-Reactive Protein

**LEF** Item# LC120766: <http://www.lifeextension.com/Vitamins-Supplements/itemLC120766/C-Reactive-Protein-CRP-Cardiac-Blood-Test>

**Labcorp directly:** TEST: 120766 CPT: 86141 <https://www.labcorp.com/test-menu/23381/c-reactive-protein-crp-high-sensitivity-cardiac-risk-assessment>

Tumor Necrosis Factor alpha (TNF-α)

**LEF** LC140673: [www.lifeextension.com/Vitamins-Supplements/itemLC140673/Tumor-Necrosis-Factor-Blood-Test](http://www.lifeextension.com/Vitamins-Supplements/itemLC140673/Tumor-Necrosis-Factor-Blood-Test)

**Labcorp directly:** TEST: 140673 CPT: 83520 [www.labcorp.com/test-menu/36231/tumor-necrosis-factor-%CE%B1](http://www.labcorp.com/test-menu/36231/tumor-necrosis-factor-%CE%B1)

Fibrinogen

**LEF** LC001610: <http://www.lifeextension.com/Vitamins-Supplements/itemLC001610/Fibrinogen-Activity-Blood-Test>

**Labcorp directly:** Fibrinogen Activity TEST: 001610 CPT: 85384 <https://www.labcorp.com/test-menu/25316/fibrinogen-activity>

IL-6/IGF-1 **LEF:** Item# LC375046

<http://www.lifeextension.com/Vitamins-Supplements/itemLC375046/IL-6-IGF-1-Blood-Test>

Not available through LabCorp directly(?)

Interleukin 6 (IL-6) LEF Item# LC140916

<http://www.lifeextension.com/Vitamins-Supplements/itemLC140916/Interleukin-6-IL6-Blood-Test>

**Labcorp:** Interleukin-6, Serum 140916 CPT: 83520

<https://www.labcorp.com/test-menu/29791/interleukin-6-serum>

Haptoglobin Special order through Life Extension

**LabCorp direct** Haptoglobin

TEST: 001628CPT: 83010

<https://www.labcorp.com/test-menu/26926/haptoglobin>

Just found, **considering – checking whether the reports have exact values, Myriad InflammationMap has reference range as “<XX”**

Cytokine Panel LCCYT

[www.lifeextension.com/Vitamins-Supplements/itemLCCYT/Cytokine-Panel-Blood-Test](http://www.lifeextension.com/Vitamins-Supplements/itemLCCYT/Cytokine-Panel-Blood-Test)

LEF site [www.lifeextension.com/Magazine/2003/5/report\\_inflam/Page-01](http://www.lifeextension.com/Magazine/2003/5/report_inflam/Page-01)

### **DNA METHYLATION AGE / EPIGENETIC CLOCK**

I rely on Zymo Research.

There's also Osiris Green, Steve Horvaths lab, Cygenia, MD Anderson, **Malav at Nova Southwestern**, Willard Freedman's "Targeted DNA Methylation & Mitochondrial Heteroplasmy Core" at the University of Oklahoma Health Sciences Center

### **MENTAL / COGNITIVE**

Note: Experts advise cognitive tests can be terribly misleading because practice effects will give a blizzard of false positive results.

Trailmaking B (and A)

\* Be aware some of the B tests you can find to download (typically the numbers and letters are in a box) are missing number 13.

One expert with very good experience in it has advised that with loss of cognitive function we lose our ability to learn with practice.

Also, after an intervention one acquaintance had a pronounced improvement in Trailmaking B results. Upon retesting over a period of time (after no treatment) it went back, almost to baseline. Then within an hour after re-treatment a pronounced improvement in Trailmaking B – suggesting it had to do more with signaling than rebuilding neurons.

If any member would be interested in locating a version of the Trailmaking B test that varies the position of the numbers or letters – or a programming whiz would create an online version that places the numbers and letters in random positions – please proceed and keep us informed.

Number memory, reaction time, verbal memory, visual memory

Human Benchmark [www.humanbenchmark.com](http://www.humanbenchmark.com)

New digit-span measurement page that can enable visitors to check the earliest cognitive changes at the very start of the 20-year pathway toward age-associated cognitive decline, MCI and Alzheimer's:

Digitspan Online Measurement [www.HealthspanStudy.com/digitspan](http://www.HealthspanStudy.com/digitspan)

Useful: Biomarkers of Alzheimers, see Early Indicators of Alzheimer's Disease  
[www.maxwellbiosciences.com/articles/research/biomarkers-alzheimers-disease](http://www.maxwellbiosciences.com/articles/research/biomarkers-alzheimers-disease)

background on the central importance of digit-span data:

<https://www.ncbi.nlm.nih.gov/pubmed/?term=wrap+blsa+digit+span>

Worth considering

<http://www.memtrax.com> \$4.99/mo \$48/yr Try it once for free

Along with these measurement pages, web pages currently used for the 2002-2018 Wild Blueberry Health Study will also be available to participants in the Microbiome SIG.

<http://www.blueberrystudy.com>

### **IMMUNE**

My circle of associates and I are seeking immune testing with interpretation from the Advanced sources below.

Note: Trying to be our own immunologist or relying on a physician who is not highly skilled in immunology can be a problem, in that we might miss something as basic as evaluating whether a pneumonia vaccination is needed.

If going to use the Stanford HIMC, then would becoming the patient of a Stanford immunologist be advised?

### **Advanced**

**We all need comprehensive testing with expert interpretation, standard for our group. UCLA Immune Assessment Core is upgrading its panel to include more age related measures, starting with TEMRA, and naïve memory cells or naïve T cells.**

[www.pathology.ucla.edu/iac](http://www.pathology.ucla.edu/iac)

[www.pathology.ucla.edu/iac-services](http://www.pathology.ucla.edu/iac-services)

Stanford HIMC <http://iti.stanford.edu/himc.html>

Stanford Immunological Center

<http://iti.stanford.edu/human-systems-immunology-center.html>

Quantrex

National Jewish Labs [www.NJLabs.org](http://www.NJLabs.org)

A major initiative is underway to develop markers as a fee for service. Details later.

CD4/CD8 ratio

Senescent T cells

Produce naïve T cell (production)

Primary NK cells

T cells

B cells

neutrophil to lymphocyte ratio (NLR)

Individuals aged 18 to 50 years had significantly lower NLR ( $p=0.019$ ) and PLR ( $p<0.05$ ) than older individuals aged 51 to 85 years.

[www.omicsonline.org/open-access/reference-values-of-neutrophillymphocyte-ratio-plateletlymphocyte-ratio-and-mean-platelet-volume-in-healthy-adults-in-north-centra-.php?aid=68492](http://www.omicsonline.org/open-access/reference-values-of-neutrophillymphocyte-ratio-plateletlymphocyte-ratio-and-mean-platelet-volume-in-healthy-adults-in-north-centra-.php?aid=68492)

For cancer patients this study suggests that the survival advantage is in part due to having a low NLR.

[www.nature.com/articles/s41598-018-22425-3](http://www.nature.com/articles/s41598-018-22425-3)

Streptococcus pneumoniae Antibody IgG 23 Serotypes lab test

IgA, IgG, IgE, IgM

Lymphocyte subset panel 5-quest

CBC with adiff blood, comprehensive metabolic panel

These LEF/LabCorp are useful but not comprehensive.

LC096925 T-Lymphocyte Helper/Suppressor Profile (has CD4, CD8 and ratio)

[www.lifeextension.com/Vitamins-Supplements/itemLC096925/T-Lymphocyte-Helper-Suppressor-Profile-Blood-Test](http://www.lifeextension.com/Vitamins-Supplements/itemLC096925/T-Lymphocyte-Helper-Suppressor-Profile-Blood-Test)

LC505016 Natural Killer Cell Surface Antigen (CD3-CD56+ Marker Analysis)

[www.lifeextension.com/Vitamins-Supplements/itemLC505016/Natural-Killer-Cell-Surface-Antigen-CD3-CD56-Marker-Analysis-Blood-Test](http://www.lifeextension.com/Vitamins-Supplements/itemLC505016/Natural-Killer-Cell-Surface-Antigen-CD3-CD56-Marker-Analysis-Blood-Test)

What else?

## **PHYSIOLOGICAL/PERFORMANCE/STAMINA**

Basic

- Body weight
- Temperature
- Blood pressure
- Body Mass Index
- Heart rate variability
- Grip strength
- Sit in chair -- number of times can stand up and sit down
- Number of push ups can do
- How many times subject can lift a weight from the ground to above head in a circular motion.
- Walking speed

How much ground you can cover in a minute, or 6 minutes

The next is a measure of stamina. Consistency from test to test is important. This may be individualized depending on one's available equipment, whether a track is available, and inclination.

Examples

- Time walking as fast as possible until you \*really\* want to stop  
(somewhat subjective, but useful and fairly accurate)
- and/or
- Time on a treadmill at a fast speed and incline until you \*really\* want to stop
- Running on treadmill with 4% incline at 5 mph, how long until have to grab rails
  
- Can stand on one leg > 20 sec(?) / How long can stand on one leg with arms held to the side.
- Reaction time [www.humanbenchmark.com/tests/reactiontime](http://www.humanbenchmark.com/tests/reactiontime)
  
- Quality of Life –  
Daily or Weekly, rate from -10 to +10.  
 0 is neutral, plus or negative numbers indicate better or worse than neutral.
  - Overall health
  - Peacefulness
  - Sharpness
  - Energy
  - Mood
  - Sleep quality
  - Aches and pains
  - Total for ScoreWeekly  
 List anything new, like change to routine, exercise, foods, medicines, supplements etc  
 this week

Worth considering but I don't do these now

- Variability of blood cells (and mortality)
- Visual contrast sensitivity (eyes and olfactors are extension of the brain)
- FEV1 -- forced air velocity, although this takes a long time to change. (takes long time bef you can see changes)
- Is this energy production?-->Resting Metabolic Rate [www.bodyspec.com/what-is-rmr](http://www.bodyspec.com/what-is-rmr)
- VO2 max testing [www.bodyspec.com/what-is-vo2](http://www.bodyspec.com/what-is-vo2)
- lean body mass, total body fat, visceral adipose tissue, and bone density  
 DEXA scan [www.bodyspec.com/what-is-dxa](http://www.bodyspec.com/what-is-dxa) (takes 2 yr bef you can see changes)

Various other assessment batteries are available

H-Scan

InSilico Medicine [www.aging.ai](http://www.aging.ai) Is this ready for prime time?

### **HRV – Heart Rate Variability**

Polar strap

Software:

SelfLoops HRV

EliteHRV software – cell phone, download from Android PlayStore or iPhone App Store

### **SENESCENT CELL MEASUREMENT**



Top level researchers at UCSD have developed a test to determine the differential expression of a panel of senescence associated genes in human PBMCs (peripheral blood mononuclear cells) before and after administering senolytic drugs.

As of Oct 2018 our group is using this in a senolytics small study.

Here's a selection of LabCorp tests (available through Life Extension) for a relatively simple and low cost measurement of before and after senolytics results collected by our senior scientist friend Bryant Villaponteau.

Description	Tests For
C-Reactive Protein (CRP)	Inflammation
Carbohydrate antigen 19.9	Aberrant Cells
Carcinoembryonic antigen	Aberrant Cells
Fasting Glucose	Energy Metabolism
Hemoglobin A1C	Glycation
Interleukin 6 (IL6)	Inflammation
Insulin-Like Growth Factor 1	Growth & Repair
Insulin	Energy Metabolism

C-Reactive Protein (CRP)

<https://www.lifeextension.com/Vitamins-Supplements/itemLC120766/C-Reactive-Protein-CRP-Cardiac-Blood-Test>

Carbohydrate antigen 19.9

[www.lifeextension.com/Vitamins-Supplements/itemLC002261/Carbohydrate-Antigen-199-Blood-Test](http://www.lifeextension.com/Vitamins-Supplements/itemLC002261/Carbohydrate-Antigen-199-Blood-Test)

Carcinoembryonic antigen

[www.lifeextension.com/Vitamins-Supplements/itemLC002139/Carcinoembryonic-Antigen-CEA-Blood-Test](http://www.lifeextension.com/Vitamins-Supplements/itemLC002139/Carcinoembryonic-Antigen-CEA-Blood-Test)

Tumor Necrosis Factor-alpha

[www.lifeextension.com/Vitamins-Supplements/itemLC140673/Tumor-Necrosis-Factor-Blood-Test](http://www.lifeextension.com/Vitamins-Supplements/itemLC140673/Tumor-Necrosis-Factor-Blood-Test)

Hemoglobin A1C (HbA1C)

<https://www.lifeextension.com/Vitamins-Supplements/itemLC001453/Hemoglobin-A1C-HbA1C-Blood-Test>

Fasting Glucose AND Insulin (combined in one test)

<https://www.lifeextension.com/Vitamins-Supplements/itemLC302186/Fasting-Glucose-and-Insulin-Blood-Test>

Interleukin 6 (IL6) AND Y Insulin-Like Growth Factor 1 (combined in one test)

<https://www.lifeextension.com/Vitamins-Supplements/itemLC375046/IL-6-IGF-1-Blood-Test>

## **HORMONES**

hGH

Testosterone

Free T4

Cortisol

TSH

Prolactin

FSH

Leutenizing Hormone  
ACTH, Plasma  
IGF I, Lc/Ms  
Z Score (Male  
Others?

LEF/LabCorp Male/Female panels can be useful

[http://www.lifeextension.com/Search#q=male%20panel&sort=relevancy&f:hierarchicalcategory=\[Products\]](http://www.lifeextension.com/Search#q=male%20panel&sort=relevancy&f:hierarchicalcategory=[Products])

[http://www.lifeextension.com/Search#q=female%20panel&sort=relevancy&f:hierarchicalcategory=\[Products\]](http://www.lifeextension.com/Search#q=female%20panel&sort=relevancy&f:hierarchicalcategory=[Products])

### **SELF ADMINISTERED HEALTH EVALUATIONS**

Normally we don't like subjective measures, but how we feel (even placebo) can be useful – or may even be the most important. *“If it's placebo – I'll take it!”*

Medical Outcomes Study Questionnaire Short Form 36

Health Survey (SF-36)

[https://www.brandeis.edu/roybal/docs/SF-36\\_website\\_PDF.pdf](https://www.brandeis.edu/roybal/docs/SF-36_website_PDF.pdf)

[https://www.rand.org/health/surveys\\_tools/mos/36-item-short-form.html](https://www.rand.org/health/surveys_tools/mos/36-item-short-form.html)

Credit to Rolf Martin for these [healthspanstudies@gmail.com](mailto:healthspanstudies@gmail.com)

Do it yourself

Daily

Quality of Life            rate from -10 to +10

Overall health

Peacefulness

Sharpness

Energy

Mood

Sleep quality

Aches and pains

Score (total of the above, or apply weights to each according to what's important to you)

Weekly

List anything new, like observations, changes to routine, exercise, foods, medicines, supplements etc this week

[www.HealthspanStudy.com/HowAreYouToday](http://www.HealthspanStudy.com/HowAreYouToday)

[www.HealthspanStudy.com/MyDiary](http://www.HealthspanStudy.com/MyDiary)

[www.HealthspanStudy.com/DietSurvey](http://www.HealthspanStudy.com/DietSurvey)

### **TELOMERES**

[www.LifeLength.com](http://www.LifeLength.com)

Worth considering, less extensive [www.TeloYears.com](http://www.TeloYears.com)

**The following may be too specialized and expensive:**

**MICROBIOME** – our Microbiome Special Interest Group is researching this

uBiome

Second Genome – mostly for larger scale partnerships

Zymo?

Mapmygut?

AmericanGut [www.americangut.org](http://www.americangut.org)

Others to be determined

### **ENERGY PRODUCTION. BIOLOGICAL**

- Sit in chair -- number of times can stand up and sit down

- Resting Metabolic Rate [www.bodyspec.com/what-is-rmr](http://www.bodyspec.com/what-is-rmr)

- Zymo ATP test??

- Actions similar to pushups and chair stand-ups like: How many times about a 15 lb weight can be lifted from the floor to above the head with arms extended (in a somewhat circular motion)

- Indirect calorimetry

- The Urinary Metabolic Profile, US BioTek

- Mitochondrial energy assay

### **DNA DAMAGE**

CONSIDERING 8-hydroxyguanine

<https://www.cellbiolabs.com/8-ohg-rna-damage-elisa> \$419

[www.cellbiolabs.com/8-ohg-rna-damage-elisa](http://www.cellbiolabs.com/8-ohg-rna-damage-elisa)

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### **Day of the Week to do lab draws**

This developed after conversation with my long time MD friend, recently retired head of pathology and lab.

I do lab tests on Tuesday mornings (or Wed if cannot do Tues)

Later in the week it's possible the blood will be sitting around over the weekend or lab techs may not be as attentive.

Not Monday because I usually take Sunday completely off and rest, so hormones etc may not be representative of normal – and lab techs are coming off a weekend.

### **Time of day**

Mornings, consistently same time. I go in 8:30-9:30

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Different labs use different techniques and different normalization standards for the same tests, so one to one comparisons of the same biomarker will not be accurate.

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Ratios of 2 different biomarkers can be useful.

Neutrophil/Lymphocyte ratio

CD4/CD8 (standard)

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When you get an unexpected lab measurement, repeat it.  
Sometimes it's wrong.

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We want parameters that don't have daily/weekly/monthly/yearly fluctuation  
That show changes over a short period of time (like 3 month)

Do tests at the same time of day

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**Lab Tests -- no MD order required**

Life Extension Foundation blood tests

You do not need doctor or prescription -- order through them. It's done at LabCorp.

They send requisition and list of LabCorp locations near you

They often have sales

[www.lifeextension.com/Vitamins-Supplements/Blood-Tests/Blood-Tests](http://www.lifeextension.com/Vitamins-Supplements/Blood-Tests/Blood-Tests)

800-678-8989

LabsMD

[www.labsmd.com](http://www.labsmd.com)

Kiosk Labs

[www.koslabs.net](http://www.koslabs.net)

Walk In Lab

**NOTE: I had a problem clicking on this. You may have to type it in your browser.**

[www.walkinlab.com](http://www.walkinlab.com)

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Over the counter urine, saliva tests at drug stores, internet like  
glucose  
keytone

others only available w/physician prescription

Labs don't want to be liable for self diagnosis – they could get sued.

Be aware of potential negative consequences of self-diagnosis and independent action