FLUIDS iQ®

RESULTS: DRIED URINE TEST

Accession #: 100035619 • Patient: April Smith

Patient: April Smith
Tel: (123) 456-789 **Email:** test@test.com
Sex: Female **Age:** 37 yr **Date of Birth:** 1989-02-02

Health Care Professional: Jane Smith

Accession #: 100035619
JD Clinic AN:
Sample received: 2026-03-05
Report issued: 2026-05-11

Sample collection:
2026-03-01 10:15 AM

METABOLIC WELLNESS PROFILE

Indican

Result 100 µg/mg C_{reat} **Low**

Total Bile Acids

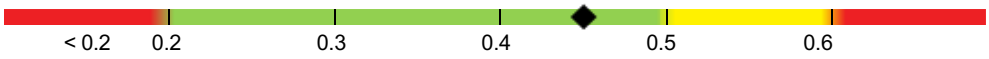
Result 15 nmoles/mg C_{reat} **Moderate**

8-OHdG

Result 75 ng/mg C_{reat} **Low**

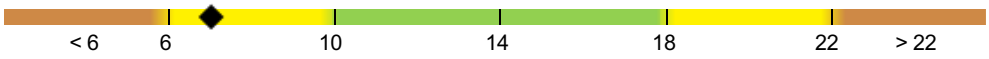
Uric Acid

Result 0.45 mg/mg C_{reat} **Optimal**



Creatinine

Result 7 mg/dL Extract



* The reference range represents a quintile distribution, each quintile being 20 % of a population determined from archival data.

These test(s) were performed by Rhein Consulting Laboratories (RCL); F.J. Nordt, Ph.D., Director, 4475 SW Scholls Ferry Road, Suite 101, Portland, OR 97225, USA. CLIA #38D0676504. The test(s) were developed and their performance characteristics were determined by RCL and have not been cleared or approved by the US FDA nor are they intended to diagnose or treat any disease(s).

GENERAL COMMENTARY

The comments provided here are for educational purposes only. The results in this report should not be interpreted as diagnostic, nor should they be viewed as treatment recommendations. Those decisions are the responsibility of the health care professional. Moreover, the reference ranges shown in this report are derived from a normal distribution of results, that encompass 95% of randomly selected individuals in a population (see below).

Urinary Indican

Urinary indican is an effective screening tool for assessment of protein digestion, dysbiosis, small intestinal bacterial overgrowth (SIBO), intestinal mucosal permeability and malabsorption states[1]. Also known as indoxyl sulfate, indican is a putrefaction product that results from dysbiotic bacterial deconjugation of dietary tryptophan to indole in the small intestine.

The traditional assessment of urinary indican utilizes the Obermeyer reagent, which gives a qualitative result. It consists of color changes in the chloroform layer, which are compared to a standard color guide, corresponding to five increasing concentrations of indican, and most often shown as: (0) Normal, (+1) Low, (+2) Medium, (+3) High, (+4) Very High.

The results in this FLUIDS iQ report are shown in a range from Negative, Low, Moderate, High and Very High; providing a general correspondence to the +1 to +4 reference guide noted above. However, the analytical result is given as a more precise quantitative measure[2], shown in a box above the color chart, as well as with a diamond marker in the chart.

Indican levels of Low, or higher, may indicate the following: Inadequate dietary protein digestion, intestinal toxemia and/or an overgrowth of anaerobic bacteria, putrefaction of undigested food in the bowels, various stomach disorders, such as insufficient hydrochloric acid (HCL), as well as pancreatic insufficiency, especially in trypsin and chymotrypsin. Indican levels that have reached High to Very High may indicate even greater insufficiency of HCL, as in hypochlorhydria and/or protease enzyme deficiency. It also may indicate hypomotility of the upper bowel, liver dysfunction, as well as increases in some common microorganisms such as *Salmonella, Staphylococcus aureus, Candida albicans* and other candida species. Inability to digest protein can lead to adverse effects on glycemic control, and hormone imbalance.

Urinary Total Bile Acids

Bile acids (BAs) play key roles in many physiological functions, such as cholesterol elimination, fat absorption, regulation of energy expenditure, as well as glucose and lipid metabolism[3]. They are synthesized in the liver and then stored in the gallbladder. Subsequent to gallbladder contraction, bile acids enter the intestinal lumen and are reabsorbed in the ileum. They are cleared from the portal circulation on the first pass through the liver.
Elevated TBA represents bile acids that were not cleared by the liver and is used as a screening marker of liver parenchymal damage, an indication of liver dysfunction. An increase in TBA may indicate a risk of viral disease, cirrhosis and drug-induced liver injury, as well as cholestasis.

An extremely low level of TBA may suggest inflammatory bowel disease (IBD), chronic malabsorption, persistent diarrhea, or starvation.

Urinary 8-Hydroxy-2-Deoxyguanosine (8-OHdG)

Reactive oxygen species (ROS) are ubiquitous in living aerobic organisms. They result either from cell metabolism or from the action of exogenous physical sources (e.g., ionizing radiation) and/or chemical compounds. Oxygen free radicals can induce a variety of damage to DNA, including DNA single and double strand breaks and base modifications[4]. Oxidative DNA damage is considered to play an important role in many pathophysiological processes, aging and cancer. 8-OHdG is an oxidized derivative of deoxyguanosine, and is one of the major products of DNA oxidation. In nuclear and mitochondrial DNA, 8-OHdG is among the most commonly observed single nucleotide-base lesions that might induce mutations in replicating DNA. Also, it is well accepted that these free radical-induced oxidative lesions are potential biomarkers of oxidative DNA damage[5,6]. These mutations are of major importance in human cancers and degenerative diseases[7].

The formation of 8-OHdG in DNA, and its urinary excretion, have been frequently measured to assess endogenous oxidative stress and damage in humans after exposure to cancer-causing agents, such as heavy metals, tobacco smoke, asbestos fibers and polycyclic aromatic hydrocarbons[8]. A biomarker of oxidative stress, 8-OHdG is associated with many disease entities including; diabetes, COPD, cystic fibrosis, rheumatoid arthritis, Parkinson's, Alzheimer's and chronic hepatitis. It is also closely associated with high blood pressure and inflammatory conditions such as pancreatitis, as well as carcinogenesis[9].

The use of 8-OHdG has also been found beneficial for the assessment of exercise-induced oxidative damage. Although most of the studies have not concluded a solid link between exercise and oxidative damage, there is a tendency of increased 8-OHdG levels during extensive exercise[10].

When not sufficiently balanced by local antioxidant systems, oxidative damage may occur to cellular lipid membranes, proteins, as well as mitochondrial and nuclear DNA.

Uric Acid and Metabolic Dysfunction

Uric Acid: The Strategic Metabolic Biomarker

Uric acid comes from 3 main sources: Fructose, purines and alcohol. In humans, uric acid levels are 4-5 times that of other mammals[16]. As it accumulates, it signals the body to prepare for caloric scarcity. This leads to the resulting end-stage diseases, such as diabetes, cardiovascular, kidney & liver diseases, as well as Alzheimer's. The reason is that the increases in uric acid may lead to metabolic syndrome, which in turn often leads to increases in blood pressure, insulin resistance, inflammation and oxidative stress. All of these conditions influence brain function. This makes uric acid levels an important new tool & a key independent risk factor that, ON ITS OWN, corresponds to injury or harm to the body[15].

Clinical Significance of Abnormal Uric Acid Levels

High Levels: High uric acid levels in urine (hyperuricosuria) are associated with diets rich in purines (eg, organ meat, seafood) and is often seen in obesity. These elevated levels are frequently linked to a multitude of metabolic diseases, requiring assessment of both dietary and renal factors. At very elevated levels they signal a high risk for uric acid kidney stones, urinary tract damage, and gout.

Low Levels: Low uric acid levels in urine (hypouricosuria), are a potential indicator of underlying metabolic, or impaired function of the kidneys. They can also result from impaired liver function or cirrhosis, given that the liver is the primary site of uric acid creation.

Creatinine Measurement in Dried Urine

Creatinine is a byproduct of muscle metabolism. In urine it serves as a stable, normalizing marker for the correction of urine dilution variability throughout the day, particularly for measuring the ratios of uric acid and albumin to creatinine. These ratios provide a more accurate assessment of results, when testing with dried urine. Providing these ratios is an essential tool for the detection of hydration, as well as early kidney disease, particularly in diabetic patients.

Clinical Significance of Abnormal Creatinine Levels

High Levels: High urinary creatinine excretion may indicate large muscle mass. Strenuous exercise can lead to muscle breakdown, which increases creatinine production. Dehydration, caused by insufficient fluid intake, makes urine more concentrated, leading to higher creatinine levels. A diet high in cooked meat, or high levels of protein consumption, may cause a temporary spike in urine creatinine levels.

Finally, one needs to consider kidney disease. Persistent high creatinine levels in urine, especially in conjunction with clinical symptoms, such as fatigue, swelling, and changes in urine output, may require an evaluation for early decline in renal function, or renal obstruction.

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Low Levels: Low urinary creatinine excretion correlates well with low or reduced muscle mass, often seen with aging (sarcopenia). Low levels are also encountered in muscle-wasting diseases, and other chronic illnesses, often accompanied by low protein intake or malnutrition. Low levels are also seen in liver disease. This differs from kidney failure, which typically causes high levels. The low levels seen with liver disease are due to impaired liver function, that can reduce the production of creatine, the precursor to creatinine. Often a very dilute urine is due to overhydration, or decreased renal function in advanced chronic kidney disease. In dried urine creatinine levels are normally reported in units of milligrams per deciliter of extract (mg/dL).

Uric Acid Measurement in Dried Urine

Testing for uric acid and related kidney/metabolic markers in dried urine (DU), offers similar advantages, to that provided by the medium of dried blood spot (DBS). The primary DU advantages include stability, easy logistics and the ability to assess daily metabolic output. Uric acid levels in DU are measurable and predictable, especially when long-term storage or transportation is required. Uric acid, along with other markers, like creatinine, remains stable in DU samples for extended periods. In addition, DU spot measurements have high accuracy, and are in consistent agreement with traditional liquid urine samples.

To ensure accuracy, the UA concentration in a DU spot sample, like the other analytes in this report, is typically measured in a ratio with creatinine (UA/Creat). This is done in order to standardize the concentration of the analyte against variations in urine dilution. Because creatinine is produced by the muscles and excreted at a relatively constant rate by the kidneys, it serves as a reliable marker to normalize for hydration status, ensuring that results are accurate, regardless of the varying dilution levels in the urine. In so doing, it converts an unreliable absolute value, from a single spot urine sample, into a reliable, consistent, and normalized measurement.

Uric acid levels in urine are tightly controlled, although levels can fluctuate due to diet, state of hydration, and medications. This control is primarily through complex, multi-step renal handling. The kidney acts as a central regulator, with about 90% of filtered uric acid reabsorbed, leaving roughly 10% to be excreted in the final urine. This precise process aims to maintain homeostasis and prevent, among other issues, kidney stone formation. In this report, a uric acid level < 0.2 is noted as ‘Very Low’, and is sometimes used to identify patients who are under- excreting uric acid. It may also indicate that the kidneys are not properly filtering waste, signaling potential chronic kidney disease, impaired kidney function, or severe liver disease.

In a random spot urine, in adults over the age of 18, the ‘normal range’ for the uric acid is generally considered to be from 0.2 to 0.5[17]. The mean uric acid level for adults on a normal diet is often shown as ~0.5. Based on the literature and laboratory evaluation, the ‘normal range’ in this report consists of the following: 0.2 to 0.5 (Optimal), and 0.5 to 0.6 (Borderline)[18].

In this report, levels > 0.6 are shown as 'Elevated', and indicate that an excessive amount of uric acid is being excreted relative to kidney function. This is a significant clinical indicator of metabolic, renal, and hematologic conditions. These elevated ratios can also denote the development of gout, although a definitive diagnosis of gout requires identifying Monosodium Urate (MSU) crystals, via joint fluid aspiration.
A uric acid level >1.0 indicates acute uric acid nephropathy, where uric acid crystals precipitate within the renal tubules, leading to rapid, severe kidney failure[19, 20]. It can also be a sign of uric acid kidney stones (Nephrolithiasis) that can block kidneys, causing infections and scarring.

Note: The level of uric acid, expressed relative to creatinine, is independent of extraction volume, whereas the individual levels of uric acid and creatinine extracted from a dried urine substrate are dependent on both the extraction volume and the area of the dried urine substrate being extracted. Therefore, the "reference range" presented in these reports is laboratory and methodologically specific and cannot be generalized.

In summary, the uric acid test is a valuable tool that provides insight into a number of important and interrelated issues, including; kidney function, gout and metabolic disorders, such as 'metabolic syndrome'. Regular testing and a healthy lifestyle can help manage uric acid levels and prevent complications.

References:

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RESULTS: SALIVA HORMONE TEST

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