FLUIDS iQ®

RESULTS: DRIED URINE TEST

Accession #: 100035619 • Patient: JOHN SMITH

Patient: JOHN SMITH
Sex: Male **Age:** 41 yr **Date of Birth:** 1982-04-04

Health Care Professional: Jane Smith

Accession #: 100035619
JD Clinic AN:
Sample received: 2023-11-10
Report issued: 2023-11-17

Sample collection:
2023-07-30 10:15 AM

METABOLIC WELLNESS PROFILE

Indican

Result > 142.9 µg/mg C **Very High**

Total Bile Acids

Result > 20.7 nmoles/mg C **Very High**

8-OHdG

Result > 16.4 ng/mg C **Very High**

Reference Range: A detailed explanation of the distribution of results may be found at the end of this report.

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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.

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.

A low level of TBA is suggestive of inflammatory bowel disease (IBD), chronic malabsorption, persistent diarrhea, or starvation.

Total bile acid (TBA) testing makes use of an assay that measures changes in absorption. In the assay, 3α-hydroxysteroid dehydrogenase reacts with all twelve bile acids, converting NAD-S to NAD+, with an increase in absorbance at 340nm, which in turn is proportional to the concentration of the bile acids.

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.

Metabolic Wellness Profile Reference Range Description

The reference ranges for Indican, TBA and 8-OHdG are shown in this report as 5 color coded sections, and described as Negative (for Indican and 8-OHdG), or Very Low (for TBA), Low, Moderate, High and Very High. Each section represents a 20th population percentile. Percentile distributions were determined from archival data. In order to adjust for variations in urine dilution, sample volume, extraction efficiency, and to normalize analyte quantification for Dried Urine Card Extracts (DUCE) specimen concentration, results are shown as a ratio of the analyte to milligrams of urinary Creatinine concentration (mgC).

Effect of Creatinine levels on DUCE recovery and Interpretation

Creatinine is used in the Metabolic Wellness Profile DUCE as a normalizer. All values of Indican, TBA and 8-OHdG are divided by the Creatinine value to obtain a final value. Thus, all values, for all 3 analytes, are significantly affected by the measured Creatinine level. However, based upon deviation from the average expected recovery, it is clear that both Indican and TBA have variable recovery over the Creatinine dynamic range. In contrast, 8-OHdG does not display this variable recovery. Therefore, a Recovery-Bias-Algorithm (RBA) has been created, and is being utilized by our laboratory, to adjust for these Creatinine concentration biases in Indican and TBA, and to provide accurate values. No additional action is required by the Health Professional or the individual being tested.

References:

1. Mayer PJ and Beeken WL. *Am J Dig Dis*, 1975, 20:1003-1009; **2.** Jackson JA et al. *J Orthomol Med*, 2000, 15: 18-20; **3.** Barthena APR et al. *Toxicol Sci*, 2015, 14: 296-307; **4.** Dizdaroglu M. *Free Rad Biol & Med*, 1991, 10: 225-242; **5.** Korkmaz KS. *J Lab Precis Med*, 2018, 3: 95; **6.** Ohno M et al. *Scientific Reports*, 2014, 4: 4689; **7.** Pilger A & Rudger HW. *Int Arch Occup Environ Health*, 2006, 80: 1–15; **8.** Wu LL, et al. *Clin Chim Acta*, 2004; 339:1-9; **9.** Valavanidis A, et al. *J Environ Sci Health C Environ Carcinog Excotoxicol Rev*, 2009; 2: 120-139; **10.** Yasuda N. *Journal of Sports Sciences*, 2015, 33: 1692–1701.