

The most recent statistics show that 2 out of every 10 couples trying to achieve pregnancy will be diagnosed with infertility. For many, this can be an extremely difficult diagnosis to accept and to understand. The first question is often “why?” Of those diagnosed with infertility, 15% of those will be due to unknown cause(s). As we struggle to understand the potential causes, one possibility emerges as a factor that is often overlooked by the traditional medical model.

Studies have shown the negative impact of toxins on the unborn child. It is now advised that women abstain from drinking, smoking and the use of illicit drugs during pregnancy due to the adverse effects upon the developing fetus. It is interesting to note that these substances were not necessarily warned of in times past. In that regard, we are becoming more conscience of the environment in which we live and the toxins we are exposed to on a daily basis. It is a wonder that any embryo survives the onslaught of chemicals and toxins its mother is exposed to daily.

The US EPA has issued warnings to women who are pregnant, of age to become pregnant, and nursing to limit their intake of seafood due to heavy metal contamination, specifically mercury. Mercury is known to have neurotoxic effects upon a developing child, amongst a host of other potential damaging effects. Studies have shown that the concentration of mercury in cord blood to be twice that of mother’s blood, yet it is not common practice to test mercury levels in women, especially infertile women. This raises an interesting question in the patient with unexplained infertility. The possibility exists that although it may not be the sole cause of infertility, it could certainly be one of several factors affecting their inability to successfully conceive and carry a child (ren).

One common question is where do heavy metals come from and how a person is exposed. The metals most commonly seen in patients tested at Oaktree Wellness Center (see link) are mercury, lead and arsenic. Mercury exposure is the second most common cause of toxic metal poisoning. The US Department of Health and Human Services lists mercury as the third most frequently found and most toxic substance in the US. Possible sources of exposure to mercury include: eating certain fish such as tuna and swordfish, dental amalgams (fillings), broken thermometers, broken fluorescent light bulbs, thimerisol (preservative in vaccinations), and breathing the air in the Chicago land area (burning coal to produce electricity emits mercury from the coal). The major exposure source for lead comes from residuals from leaded gasoline, lead paint, and lead pipes in older homes (or pipes assembled using lead solder). For arsenic, the main source is CCA pressure treated wood. Exposures do not have to be recent, some metals can linger from childhood and even from in utero or mother’s breast milk! Not every person exposed will have high levels. Levels can be affected by amounts of exposure as well as genetic individuality. Some people are genetically designed to release toxic metals, while others tend to retain them.

How does a person find out about their levels of heavy metal exposure? The standard medical model measures exposures to heavy metals using blood serum testing.

Unfortunately, this only gives an accurate representation of the body's burden in an acute state. In other words, it will only show a recent exposure and does not indicate a chronic exposure or what the body may be storing. In example, mercury tends to concentrate in the kidney. Hair analysis is also not an adequate measure because if low, it does not indicate whether the person has no exposure or whether the person is simply not excreting it. The best way to test for total body burden is to using a chelating agent that binds to the heavy metal and then measuring the amounts of the different metals that are excreted in the urine.

At Oaktree Wellness Center, they challenge patients for heavy metal exposure using two different chelating agents, Calcium Disodium EDTA and DMPS. Oaktree uses two different chelators because each has an affinity for different metals and gives a more accurate measure of total body burden. A potential patient is first seen by the doctor for a quick review of history and a physical exam. Blood work is ordered prior to performing the challenge. Patients that have had recent blood work do not have to repeat this step. The patient is then scheduled for a heavy metal challenge which involves an intravenous drip for approximately 1 _ hours and an oral capsule. The patient then receives a kit to take home and collect urine in for the next 6 hours. This urine is then sent to the lab to be analyzed. Once the doctor has received and reviewed the results, a brief office consult is scheduled to review the results and determine the next steps.

Impact of heavy metals on hormonal and immunological factors in women with repeated miscarriages, Hum Reprod Update. 1998 May-Jun;4(3):301-9.

This study was done by checking heavy metal levels of women with repeated miscarriages after challenging them with a dose of the chelating agent DMPS. They found that women who showed high amounts of heavy metals excretion correlated to different immunological (natural killer cells, T cell subpopulations) and hormonal (progesterone, oestradiol, prolactin, thyroid stimulating hormone) parameters. They concluded that heavy metals seem to have a negative impact on ovarian as well as on pituitary function. They believe that heavy metal-induced immunological changes may interfere with the physiological adaptation of the immune system to the state of pregnancy with the result of a miscarriage.

Effect of occupational exposures on male fertility: literature review, Ind Health. 2003 Apr;41(2):55-62.

This study reviewed occupational exposures to potentially toxic agents to reproduction and the effects of psychological stress at work on male fertility. They found significant associations between impaired semen parameters and exposures to heavy metals such as lead and mercury, pesticides, ethylene glycol and estrogens. Their review also showed that exposure to radiation and heat deteriorated sperm.

Heavy metals and fertility, J Toxicol Environ Health 1999 Mar 12;56(5):371.

This study examined the correlation between women with high levels of heavy metals after a challenge with oral DMPS, a chelating agent and different factors of infertility. They found that different heavy metals were associated with different gynecological conditions such as uterine fibroids, miscarriages, hormonal disorders. They also found that diagnosis and reduction of an increased heavy metal body load improved the spontaneous conception chances of infertile women.

Occupational exposure and effects on the male reproductive system, Cad Saude Publica. 2006 Mar;22(3):485-93. Epub 2006 Mar 27.

This study reviewed the effects of synthetic toxic substances acting on the endocrine system (endocrine disruptors) as cause of male infertility. They found that pesticides such as DDT and heavy metals such as mercury, lead, and cadmium, as well as substances from various industrial uses such as dioxins, polychlorinated biphenyls (PCBs), ethylene dibromide (EDB), phthalates, polyvinyl chloride (PVC), and ethanol are among the main endocrine disruptors that can cause male infertility. Based on the literature, gonadal dysfunction and congenital malformation are the main alterations caused by these substances in the male reproductive system.

Sensitization to inorganic mercury could be a risk factor for infertility, Neuro Endocrinol Lett. 2005 Aug;26(4):277-82.

This study examined the reaction of immune cells in infertile patients when exposed to different metals. They found that infertile patients that reacted to mercury, iron, aluminum and silver had immune cells that produced less gamma interferon and more anti-sperm antibodies. They concluded that infertility patients with metal intolerance may release metal ions from dental materials which may adversely affect fertility.

The effect of fish consumption on blood mercury levels of pregnant women, Yonsei Med J. 2006 Oct 31;47(5):626-33.

This study examined the blood mercury levels of pregnant women who ate fish and who consumed no fish. They found that the group that ate fish more than 4 times per month had significantly higher levels of mercury than those that did not consume fish. They also found that the amount of mercury in the cord blood of the baby was twice the amount found in the mothers' blood.

Fetal methyl mercury exposure as measured by cord blood mercury concentrations in a mother-infant cohort in Hong Kong, Environ Int. 2007 Jan;33(1):84-92. Epub 2006 Sep 8.

This study examined newborn infants exposed to mercury in utero and whether it increased the risk of neurotoxic effects. They found that increased maternal fish consumption and increased maternal age were found to be associated with increased cord blood mercury concentrations. Women that ate fish from the ocean also had increased mercury concentrations over women that ate freshwater fish.

Antepartum seafood consumption and mercury levels in newborn cord blood, Am J Obstet Gynecol. 2006 Jun;194(6):1683-8. Epub 2006 Apr 25.

This study determined the levels of fetal mercury exposure by measuring mercury levels in newborn cord blood and to analyze the association with fish consumption during pregnancy. The results indicated that 28.3% of the participants had measured mercury levels above the US Environmental Protection Agency's recommended reference dose.

A revised probabilistic estimate of the maternal methyl mercury intake dose corresponding to a measured cord blood mercury concentration, Environ Health Perspect. 2005 Feb; 113(2):155-63.

In 2001, the U.S. EPA adopted a revised reference dose (RfD) of 0.1 micrograms per kilogram per day of methyl mercury. The reference dose is based on neurologic developmental effects measured in children associated with exposure in utero to methyl mercury from their mother's diet. This study reviewed maternal intake of methyl mercury and estimated the corresponding dose in fetal cord blood to be .2 micrograms per kilogram per day.

Correlations between mercury concentrations in umbilical cord tissue and other biomarkers of fetal exposure to methyl mercury in the Japanese population, Environ Res. 2007 Jan;103(1):106-11. Epub 2006 May 2.

This study showed that methyl mercury is one of the most risky substances to affect humans through fish consumption, and the fetus is known to be in the most susceptible group. They found that more than 90% of mercury in cord tissue, cord blood, and maternal blood was methyl mercury and that mercury in cord blood was about two times higher than in maternal blood. The findings of this study indicate that the amount of mercury found in cord tissue and cord blood is correlated to the amount of fetal exposure at birth.

Mercury concentration and fish consumption in Taiwanese pregnant women, BJOG. 2007 Jan; 114(1):81-5. Epub 2006 Nov 1.

This study examined the relationship between maternal fish consumption and total mercury concentration in maternal blood, umbilical cord blood, and placenta tissue of pregnant women. They found that 89% of the maternal blood mercury concentrations exceeded the US National Research Council recommended values.

Infertility, blood mercury concentrations and dietary seafood consumption: a case-control study, BJOG. 2002 Oct; 109(10):1121-5.

This study compared the blood mercury concentrations of infertile couples with those of fertile couples and examined the relationship between blood mercury concentrations and seafood consumption. They found that infertile couples had higher blood mercury concentrations than fertile couples. 'Infertile males with abnormal semen' and 'infertile females with unexplained

infertility' also had higher blood mercury concentrations than their fertile counterparts. Blood mercury concentrations were positively correlated with quantity of seafood consumption. Infertile subjects with elevated blood mercury concentrations consumed a larger amount of seafood. They concluded that higher blood mercury concentrations were associated with male and female infertility and that higher seafood consumption is associated with elevated blood mercury concentrations in our infertile population.