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Relationship Between *Toxoplasma gondii* and Myeloperoxidase and Lactoferrin

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ABSTRACT

The study was conducted between August 2021 and April 2022, and samples were collected as outpatients at a fertility laboratory in Baghdad Governorate, whether they were infected or not.

A total 150 semen samples were collected from men participating in the Baghdad Provincial Fertility Laboratory, Information about these people was obtained through paper a questionnaire that provides a wealth of information about the subject of the study, including name, age, education, date, place of residence, and whether there are cats in the home.

The effects of parasites on myeloperoxidase and Lactoferrin levels, that low level of myeloperoxidase; while a height in Lactoferrin levels competitive with control group.

INTRODUCTION

Monoparasitic intracellular parasite *Toxoplasma gondii* is found in all cells. This parasite causes toxoplasmosis, often known as cat disease, which is a disease that affects both humans and animals and is a worldwide opportunistic disease, especially in immunocompromised people, while being asymptomatic in immunocompetent people, depending on the detection of anti-toxoplasma antibodies in the serum, the worldwide infection rate ranges from less than 10% to around 90%. (Torgerson and Mastroiacovo, 2013), The parasite is distinguished by its capacity to enter and attack all nucleated body cells, multiply inside them, and spread to different organs in the host's body, causing infection to spread throughout the body and demonstrating the parasite's capacity to pass through life barriers like the placenta, brain, and eye; Because being isolated from the immune impact indicated by the influx of antibodies is immunologically favorable for the parasite. The parasite affects the trophoblast cells in the placenta, which are in charge of the placental exchange of nutrients and gases that occurs at the interface between the mother and the fetus (Randall and Hunter, 2011). Dopamine, which is in charge of transferring nerve impulses from one cell to another, is one neurotransmitter that is affected by toxoplasmosis infection in terms of its levels and behavior.

In both acute and chronic infections, a change in its levels was seen in couples who had the parasite (Stibbs, 2010), recent research has linked some behavioral abnormalities to migraine headaches and behavioral disorders that happen during sexual desire (Sawa and Snyder 2012).

The levels of the male hormone testosterone are affected by *Toxoplasma* parasite infection in married men and women, with differences in levels of the hormone in men and women as well as behavioral disorders linked to the hormone's impact on showing some of the characteristics affecting the hormone in men and women (Roberts, *et al.* 2001).

There is no effective treatment for cases where the parasite is in a latent state and the phase is slow to reproduce inside living cells, but some studies advise the use of Chloroquine in these situations. A group of medications including Clindamycin and Trimethoprim uses in the treatment of acute cases, and Spiramycin is used in acute and chronic cases (Geetha *et al.*, 2019).

Aim of the Study:

1. A study of the incidence of toxoplasmosis among males visiting outpatient clinics in Baghdad and a study of how the parasite affects men's ability to conceive.
2. By doing joint immunological testing between partners, it is possible to determine whether there is a chance of sexual transmission of the parasite.
3. Looking into how much Lactoferrin and Myeloperoxidase, two important antioxidants, are present in male semen after a toxoplasma infection.

MATERIALS AND METHODS

Sample Collection:

Semen Samples Fluid:

Four sets of 150 semen samples were taken for the men's outpatient clinics in Baghdad (infected with *T. gondii*, sterile, infected with *T. gondii* and sterile, and control group), it was put in stainless-steel cup and put in the incubator for 30 minutes. After that, the semen was put in an Ebnndrof tube and put in the refrigerator, and the tests for myeloperoxidase and Lactoferrin were run, and detection by human ELISA.

RESULTS AND DISCUSSION

Myeloperoxidase:

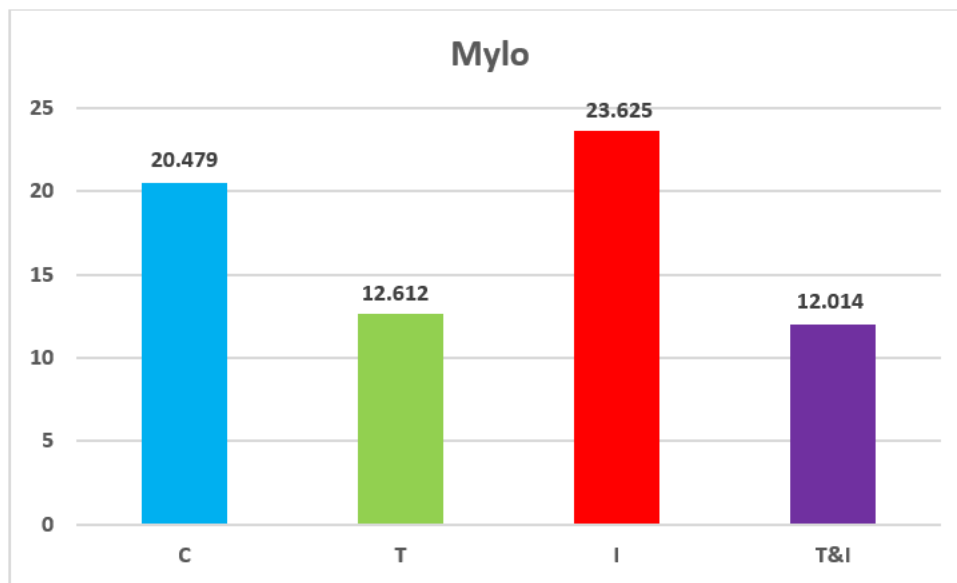
According to the latest findings, MYLO levels in patients with *Toxoplasma gondii* infection were lower than those in the control group, which had MYLO levels

of 20.479 and 2.932b. In addition, MYLO levels in patients who were sterile were higher than those in the control group, which had MYLO levels of 23.625 and 2.932b, and they were lower than those in the control group, which had MYLO levels of 12.014 a. show in Table 1 and Figure 1.

One in seven couples of any age experience infertility, which is a frequent issue (Slama *et al.*, 2012). Human spermatozoa develop networks in a dose-dependent way. This interaction has a detrimental effect on sperm motility, so spermatid networks are also believed to lower the ability to fertilize (Zambrano *et al.*, 2016) Leukocyte presence can be determined by myeloperoxidase, a common biomarker, though, taking into account the how important his current activity level was. Myeloperoxidase's particular activity might be measured by the researchers when a test examines both the activity and concentration of proteins (Stamp *et al.*, 2012). Myeloperoxidase was found in prostate glandular epithelial cells in a recent study (Roumeguere *et al.*, 2012), although its relevance is not yet evident. Future research should concentrate on how and where internal processes may have an impact on the health of sperm. The content of the protein myeloperoxidase in the seminal plasma was discovered to be correlated with various indicators of sperm motility, in specifically, the proportion of sperm that move quickly ($r = 20160.327$, $p = 0.021$), this implies that oxidative stress has an impact on this process. Fast-moving sperms are more likely to successfully penetrate the cervical mucus, and as a result, they are a sign of a fertile population (Bjorndahl, 2010).

Table 1: Myeloperoxidase enzyme in healthy people, patients with the *Toxoplasma gondii* parasite and sterile.

Parameter Groups	Mylo
	Mean \pm SD
C	20.479 \pm 2.932b
T	12.612 \pm 1.637c
I	23.625 \pm 6.449a
T&I	12.014 \pm 1.728c

**Fig. 1** Myeloperoxidase enzyme in healthy people, patients with the *Toxoplasma gondii* parasite and sterile.**Lactoferrin:**

According to the latest findings, LACTO levels in patients with *Toxoplasma gondii* infections increased to 18.894 3.106 b from 10.516 1.281 and in the control group. They also increased to 19.264 7.965 b from 10.516 1.281 in the control group (Table 2 and Fig. 2). Additionally, the findings demonstrated a rise in LACTO levels of 18.818 5.185b vs the control group (10.516 1.281a in the infected and sterile individuals).

Different approaches exist for LF to combat parasites. For instance, *Toxoplasma gondii* and *Eimeria stiedai* sporozoites had decreased infection after being incubated with LF B. It is thought that LFCin alters host-parasite interactions by compromising

the parasite membrane's integrity (Omata *et al.*, 2001). Its antiparasitic action against *Pneumocystis carinii* is based on the parasite and LF competing for iron (Cirioni *et al.*, 2000). On the other hand, some parasites, such as *Trichomonas* embryo, may utilize LF as an iron ion supplier (Tachezy *et al.*, 1996). An iron-binding protein called lactoferrin has a molecular weight of roughly 80 kDa (Aisen *et al.*, 1972; Baldwin *et al.*, 1993). Seminal plasma from pigs and people contains lactoferrin at concentrations of 0.1 to 1.0 mg/ml (Buckett *et al.*, 1997). For the first time, a study measured the amount of lactoferrin present in horse seminal plasma. The range of lactoferrin concentration in stallion sperm plasma appears to be similar

to that in pig sperm plasma (Roberts *et al.*, 1975). According to a recent study, decrease sperm and oligospermic semen

samples from individuals had higher lactoferrin concentrations than normal samples (Buckett *et al.*, 1997).

Table 2: Lactoferrin enzyme in healthy people, patients with the *Toxoplasma gondii* parasite and sterile.

Parameter Groups	Lacto
	Mean \pm SD
C	10.516 \pm 1.281a
T	18.894 \pm 3.106b
I	19.264 \pm 7.965b
T&I	18.818 \pm 5.185b

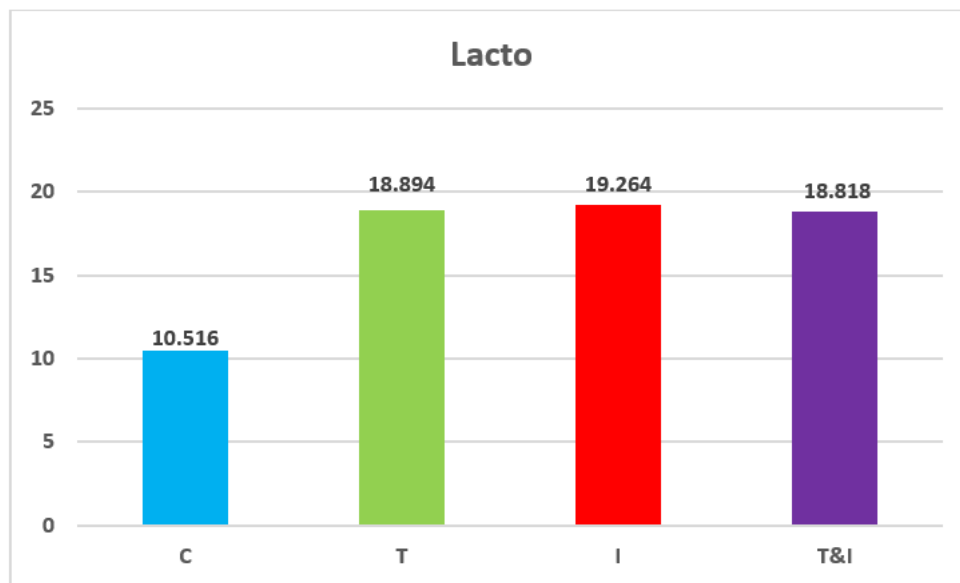


Fig. 2: Lactoferrin enzyme in healthy people, patients with the *Toxoplasma gondii* parasite and sterile.

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