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Relationship pregnancy with IgA, IL-6 and TGF-1β in Holstein cows

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***Abstract*---**The current study was conducted in private dairy cows station located in middle of Iraq by using 80 samples of blood during the period 2021 – 2022 in aim to determine the relationship of pregnancy with IgA, IL-6 and TGF-β concentration. Results showed a significant effect (P≤0.01) of IgA level on according pregnancy status, the highest concentration was recorded in pregnant cows 108.09 µ/ml while the lowest concentration was recorded in non-pregnant cows (144.63µ/ml). Results showed a significant difference in TGF-1β concentration according to pregnancy, the highest concentration was noticed in pregnant cows compared with the non-pregnant cows namely, 49.88 and 38.97 pg/ml respectively. Results showed a significant effect (P≤0.01) of IL-6 level on according pregnancy status, the highest concentration was recorded in pregnant cows 477.29 pg/ml while the lowest concentration was recorded in non-pregnant cows (345.11pg/ml).

***Keywords*---**Holstein cows, Pregnancy, cytokines.

Introduction

The host immunity is divided classically in to two divisions, innate and adaptive immunity. The 1st type is reacted unlimitedly with diseases pathogens while the 2nd type is response slowly but in limited direction to these pathogens (Farber et.al., 2016). Studies referred that the innate immunity react through the natural cells killing and innate lymph cells also while the adaptive immunity represented to the multiple types of globulins and lymph cells such as T and B cells (Boehm et.al., 2012; Danilova, 2012).

Reproductive immunity mean the recognition and remove the strange substances (microbial organs or its products) inside the reproductive system and lead to fertility problems in mammals (Weiss et.al., 2009). The female reproductive

system is many organs which immunologically officinal to different reactions towards inflammation, embryo accepting, development of fetus, tissues formation and then complete parturition successfully (Schuberth et.al., 2008 ; Ault et.al., 2019).

Cytokines are a wide group of compounds which play a crucial role in reproductive efficiency of females and the interleukins are cytokines sub group which produce many compounds to enhance the fetus growth and development (Menachem-Zidon et.al., 2011; Gulati et.al., 2016). IgA is a globulin which discover 1953 and its about 2 gm / litter in normal conditions and secreted from the most of body systems especially from respiratory and reproduction systems and play a crucial role against the invaded microbes (Suzuki et.al., 2011). TGF-1β is a multi directions cytokine and contributes with many physiological activities (Jena et.al., 2021).

Interleukin -6 (IL-6) is essential member of the interleukins family , contains 212 amino acid with 21 – 26 Kd as a molecular weight (Evans et.al., 2015). IL-6 can behave as autocrine or paracrine ligand in body muscles and also behave as a hormone during metabolism. In addition, IL-6 enhance the insulin function and control of many other interleukins releasing such as IL-1, IL-10 (Scheller et.al., 2011; Catoire and Kresten, 2015) .

The major aim of the current study is to determine the IgA, TGF-1β and IL-6 concentration during pregnancy period and compare these concentrations with non pregnancy period in Iraqi Holstein cows and attempt to use the information as a prediction tool for possible changes in reproduction depending on the cytokines concentrations to avoid any reproductive problems or difficulties and decrease the risk of economical loss.

Materials and Methods

The current study was conducted in Taj –AL-Nahrain private station located in AL-Daggara about 20 Km north east of AL-Dewanya province center by using 80 samples of blood during the period 2021 – 2022 in aim to determine the changes of IgA, tgf-1β and IL-6 concentration in pregnant and non pregnant in Holstein cows. Blood samples were withdrawn from uterine vein through milking and ELISA test was used to determine the IgA, TGF-1β and IL-6 concentrations from each cow.

Statistical analysis

Data were analyzed using SAS (2012) computer program by general linear model procedure (GLM) according to the following model:
$Yijk = \mu + Ti + eijk$
Where: μ: the overall mean
Ti: effect of pregnancy status (pregnant and non pregnant)
eijk : is a random error.
Significant differences among groups were detected by general linear model (GLM) and Duncan's multiple range test (Duncan,1955) was used to compare differences among means.

Results and Discussion

Results showed a significant effect (P≤0.01) of IgA level on according pregnancy status (Fig.-1),the highest concentration was recorded in pregnant cows 108.09 µ/ml while the lowest concentration was recorded in non pregnant cows (144.63µ/ml).

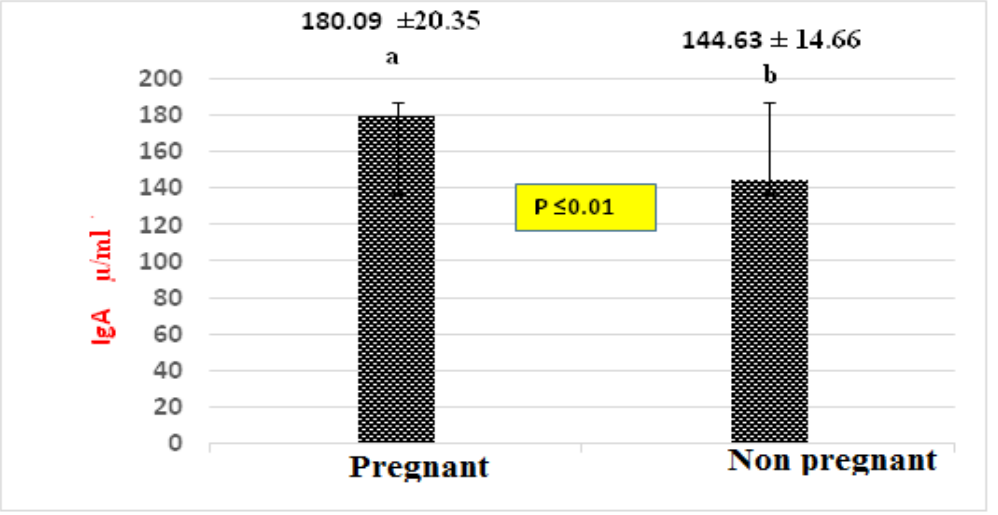

Fig.-1: Alteration of IgA concentration in pregnant and non pregnant cows

Results showed a significant difference in TGF-1β concentration according to pregnancy (Fig.2), the highest concentration was noticed in pregnant cows compared with the nonpregnant cows namely, 49.88 and 38.97 pg/ml respectively.

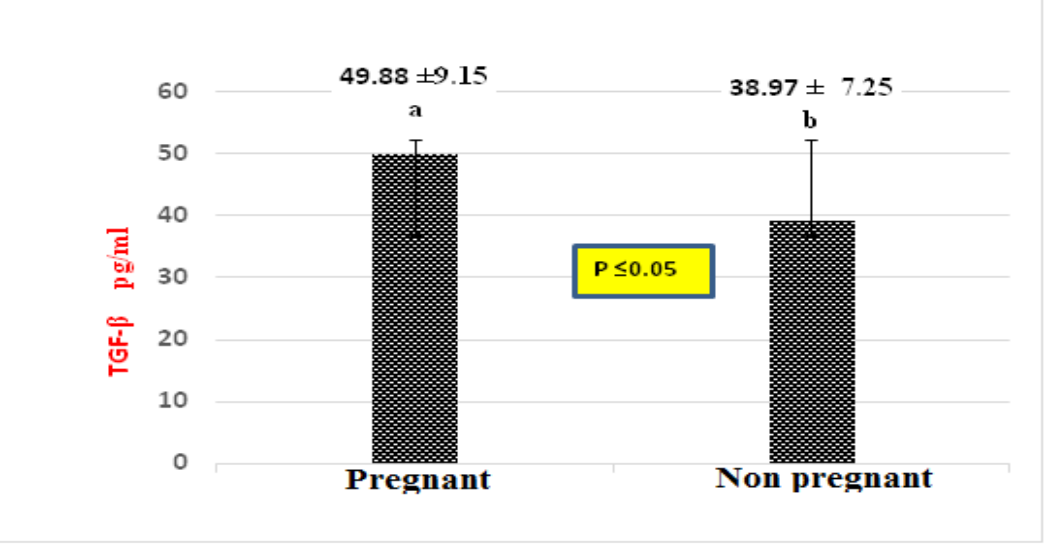

Fig.-2: Alteration of TGF-1β concentration in pregnant and non pregnant cows

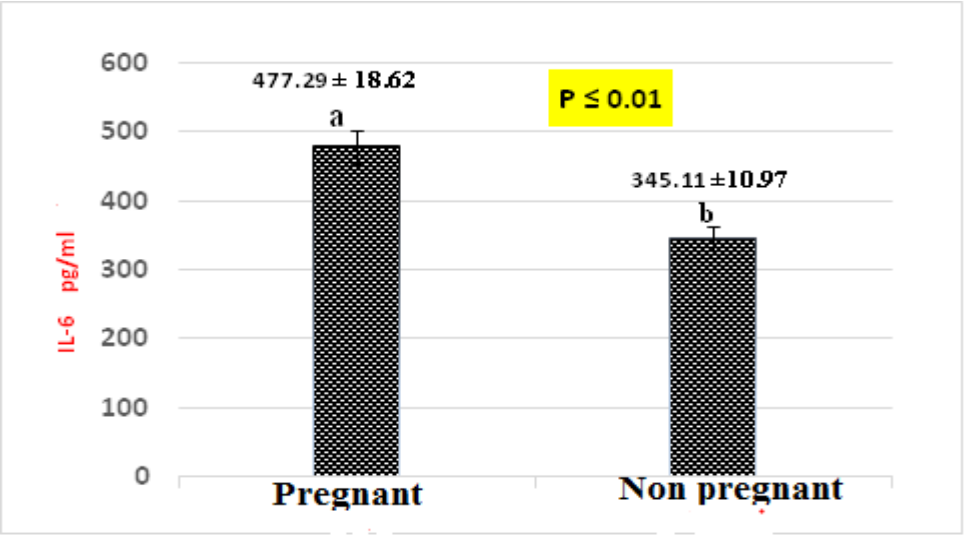

Fig.-3: Alteration of IL-6 concentration in pregnant and non pregnant cows

Results showed a significant effect (P≤0.01) of IL-6 level on according pregnancy status (Fig.-3),the highest concentration was recorded in pregnant cows 477.29 pg/ml while the lowest concentration was recorded in non pregnant cows (345.11pg/ml). The current results are agree with many past researches results that mentioned effect of L-6 or other similar interleukins on reproductive performance in dairy cattle such as Trevisi et.al (2016) who mentioned that the alterations of interleukins levels are strongly differed according to reproductive chancges. Chastant and Saint-Dizier (2019) indicated that the increase of interleukins during artificial insemination lead to reduce the fertility and increase the probability of pregnancy failure.

Other studies proved a relationship of interleukins concentration with pregnancy and the current result are harmonic with the results of Ishikawa et. al., 2004; Xie et.al., 2017 and Ealy et.al., 2021. The results similar with the results of Dougan et.al. (2019) who referred that the cytokines behave as embryokines during pregnancy and increase to support both dam and calve immunity.

The results agree with the results of Sosa et.al. (2020) who proved that the most of cytokines concentrations increased in pregnancy period to increase the placenta efficiency. The current results agree with those of Mazzoni et.al. (2020) who mentioned a significant increase of cytokines during pregnancy to maintain the pregnancy and referred to a strong relationship of cytokines concentration with progesterone and estrogen regulation.

In conclusion, the current results are a good tool to determine the possible effect of cytokines levels on pregnancy and predict the reproductive difficulties through the concentration of this cytokines to improve the cow performance and avoid the reproductive difficulties earlier.

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