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List of Abbreviations

AGRP	Agouti-related peptide
ATII	Alveolar type II
ATPase	Adenosine triphosphatase
BBB	Blood brain barrier
BW	Body weight
CART	Cocaine and amphetamine-regulated transcript
DIT	Diiodotyrosine
GH	Growth hormone
H chains	Heavy chains
IgA	Immunoglobulin A
IgD	Immunoglobulin D
IgE	Immunoglobulin E
IGFBPs	Insulin growth factor binding proteins
IGF-I	Insulin growth factor-I
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IL-1	Interleukin-1
JAK	Janus activated kinase pathway
L chains	Light chains
LF	Lipofibroblast
MAPK	Mitogen-activated protein kinase
MCH	Melanin-concentrating hormone
MIT	Monoiodotyrosine
mRNA	Messenger ribonucleic acid
mTOR	Mammalian target of rapamycin
NEB	Negative energy balance
NPY	Neuropeptide Y
PI-3K	phosphatidyl inositol-3 kinase
PL	Placental lactogen
POMC	Proopiomelanocortein
PRL	Prolactin
PTHrP	parathyroid hormone-related protein
STAT	Signal transducer and activator of transcription pathway
T3	Triiodothyronine
T4	Thyroxin
TG	Thyroglobulin
VFA	Volatile fatty acids
α-MSH	α-melanocyte-stimulating hormone

SUMMARY AND CONCLUSIONS

The present work was designed to clarify the relationship between leptin, body weight and their metabolic effects in blood and milk of lactating buffaloes through determination of daily milk yield and some biochemical parameters.

Biochemical parameters chosen were: serum and milk leptin, serum and milk Prolactin, serum insulin, serum insulin growth factor-I, serum T3 and serum and milk immunoglobulins (IgG, IgM and IgA).

Experimental animals:

Thirty healthy buffalo cow at fourth lactation period were used. The animals were belonging to large ruminant unit, Sakha Experimental Farm, Animal Production Research Institute at Kafrelsheikh governorate. The animals under study were divided into three equal groups according to stage of lactation, each consisting of 10 animals:-

The first group was at the 1st week after parturition.

The second group was at the mid lactation period three months after parturition and the animals were pregnant.

The third group was at the late lactation period six months after parturition and the animals were pregnant.

The obtained results are summarized as follows:

1- Effect of stage of lactation on body weight and daily milk yield in lactating buffaloes:-

The present work indicated that, B. W. of lactating buffalo cows were significantly increased ($p \leq 0.05$) throughout period of lactation. The mean values of daily milk yield was significantly decreased ($p \leq 0.05$) with stage of lactation between mid and late lactation.

2- Effect of stage of lactation on serum leptin and serum Prolactin concentration in lactating buffaloes:-

Concerning the effect of stage of lactation on the mean values of serum leptin, the present study demonstrated that, the mean values of serum leptin exhibited an insignificant increase with stage of lactation. The present study revealed that, the mean values of serum Prolactin was insignificantly increased then decreased with stage of lactation.

3- Effect of stage of lactation on milk leptin and milk Prolactin concentration in lactating buffaloes:-

The present study revealed that, milk leptin exhibited a significant decrease with stage of lactation. The mean values of milk Prolactin was constant with stage of lactation.

4- Effect of stage of lactation on serum insulin, insulin-like growth factor I - (IGF-I), and triiodothyronine (T3) concentration in lactating buffaloes:-

The present study revealed that, serum insulin was significantly increased with stage of lactation. The present study revealed that, serum insulin like growth factor-I increased with stage of lactation but not significant. The present study revealed that, serum T3 was significantly increased ($P<0.05$) with stage of lactation.

5- Effect of stage of lactation on serum immunoglobulin concentration in lactating buffaloes:-

The present study revealed that, serum immunoglobulins were significantly increased ($P<0.05$) in IgG, IgM then significantly

decreased (P<0.05) in the late stage whereas IgA was significantly increased (P<0.05) and not significantly changed in the late stage of lactation.

6- Effect of stage of lactation on milk immunoglobulin concentration in lactating buffaloes:-

The present study revealed that, milk immunoglobulins were significantly decreased (P<0.05) in IgG, IgM and IgA in mid lactation and not significantly changed in the late stage of lactation.

7- Overall correlation coefficients between body weight and different serum biochemical parameters:-

The present study showed that, there were an indirect correlation between body weight and serum leptin. In the same time there were a direct correlation between body weight and serum Prolactin**.** Moreover there were a direct correlation between body weight and serum insulin and insulin like growth factor-I and the correlation was significant in insulin. There were a direct highly significant correlation between body weight and serum T3. The study revealed an indirect highly significant correlation between body weight and serum IgG and IgA, whereas this correlation was indirectly significant between body weight and IgM.

8- Overall correlation coefficients between body weight and daily milk yield and different milk biochemical parameters:-

There was a direct significant correlation between body weight and daily milk yield. Moreover there was a direct correlation between body weight and milk leptin. Furthermore there was a direct correlation between body weight and milk Prolactin. Meanwhile

there was a direct highly significant correlation between body weight and milk immunoglobulins.

9- Overall correlation coefficients between serum leptin and different serum biochemical parameters:-

The study demonstrated that, there was an indirect correlation between serum leptin and Prolactin. Also there was a positive correlation between serum leptin, insulin and insulin like growth factor-I. On the contrary there was an inverse correlation between serum leptin and T3. Also it was clear from the present study that, there was a direct significant correlation coefficient between serum leptin and serum immunoglobulins.

10- Overall correlation coefficients between milk leptin and daily milk yield and different milk biochemical parameters:-

There was an inverse correlation coefficients between milk leptin and daily milk yield. Also there was a direct correlation coefficients between milk leptin and milk Prolactin. The study showed that, there was a highly significant direct correlation coefficients between milk leptin and milk immunoglobulins**.**

Conclusion

It could be concluded from the present study that, Serum leptin exhibited significant positive correlation with IgG and IgA and positive correlation but not significant with insulin, IGF-1 and IgM. Moreover, there was a negative correlation but not significant with body weight, Prolactin and T_3. Whereas milk leptin showed a high significant positive correlation with IgG, IgM and IgA. This positive

correlation was not significant with body weight and Prolactin and negatively correlated and not significant with daily milk yield. So milk leptin have a very important role as an immunostimulant. Owing to the important role of leptin as an immunostimulant we advice buffalo cows breeders to :

1- Provide balanced rations at the prepartum and postpartum periods for opposing the immunosuppressive effect induced by starvation.

2- Provide milk at postpartum period for suckling of newly borne calves as a mean for transferring passive immunity.