

Sex Chromatin Picture in Sharabi Cows in Iraq

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Abstract

The incidence of sex chromatin and it's various shapes in polymorph nuclear leucocytes (PMNL) was investigated in Iraqi cows (Sharabi). A total of 72 animals were included in the study (15 heifers and 57 adult cows, both fertile and those suffering from reproductive problems). Results indicated, that sex chromatin incidence in Sharabi heifers (6 month old) was 6.9% distributed in 4 shapes (Drumstick 2.64%, Small club 0.28%, Tear drop 1.42, Sessile nodule 2.57%). In the fertile adult cows (4-6 years old) the incidence was 8.7% which was significantly ($P < 0.05$) higher than in heifers, distributed in 4 shapes: Drumstick 4.1%, small club 0.5, Tear drop 0.9, Sessile nodule 3.2%. The % of Drumstick and sessile nodule was significantly ($P < 0.05$) higher than in heifers. Concerning infertile animals the incidence of sex chromatin decreased significantly ($P < 0.05$) in animals suffering from abortion, still birth & repeat breeder than the fertile animals. The distribution of various shapes of sex chromatin also decreased significantly in all these animals as compared to fertile animals. Key Words: Sex chromatin, Polymorph nuclear leucocyte, reproductive problems, cows.

صورة الصبغين الجنسي في الأبقار الشرايبة في العراق

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الخلاصة

الهدف من هذه الدراسة قياس نسبة تواجد الصبغين الجنسي وأشكاله المختلفة في خلايا العدلات للأبقار الشرايبة. أجريت الدراسة على 72 بقرة بواقع 15 بقرة بكر و 57 بقرة بالغة صحيحة وتعاني مشاكل تناسلية. أوضحت النتائج بأن نسبة تواجد الصبغين الجنسي في الأبقار الشرايبة الأباكير (عمر 6 شهر) كانت 6.9 % موزعة على أربعة أشكال عصا الطبال 2.64 %، بروز بدون ساق 0.28 %، دمعة العين 1.42 %، الهراوي 2.57 %. في الأبقار البالغة (4 - 6 سنوات) كانت نسبة تواجد الصبغين الجنسي 8.7 % والتي أظهرت اختلافا معنويا ($P > 0.05$) عنها الأباكير وموزعة كالآتي: عصا الطبال 4.1 %، بروز بدون ساق 0.5 %، الهراوي 3.2 %، ودمعة العين 0.9 %.

لقد أظهرت نسبة تواجد شكل الهراوي وعصا الطبال اختلافا معنويا بمستوى معنوية ($P > 0.05$) في الأبقار البالغة عنها الإناث الأباكير.

وفيما يتعلق بالإناث التي تعاني مشاكل تناسلية انخفضت نسبته تواجد الصبغين الجنسي معنويا تحت مستوى ($P > 0.05$) في الحيوانات التي تعاني من الإجهاض والأجنة الميتة والصرف المتكرر عنها في الحيوانات السليمة. وانخفضت نسبة تواجد الصبغين الجنسي بأشكاله الأربعة في الأبقار التي تعاني مشاكل تناسلية بالمقارنة مع الحيوانات السليمة.

Introduction

It has been reported that sex chromatin abnormalities in bovine is associated with impaired reproductive efficiency (1,2,3,4,5). Moreover, cows suffering from anestrus showed; absence of sex chromatin (drumstick) in their polymorph nuclear leucocyte (6). Cows in Iraq (lopl or imported) suffer from several reproductive problems. In view of the fact that no study has been reported on the sex chromatin pattern in cows in Iraq, the present investigation was conducted to study sex chromatin in a local cows, Sharabi, in both fertile and infertile animals.

Material and Methods

The study was conducted on a total of 72, Sharabi, (local breed) cows both, heifers 6 months old (15) and adult cows, 4-6 years old, (57). The animals were raised in Al-Rashidyhia field station for animal production, Mousl (IRAQ). They were kept under a fairly good management and both concentrated & green food were available along with water *ad libitum*.

Blood samples were collected from the Jugular vein using heparinized vacutainer tubes after that, they were centrifuged and the buffy coat was aspirated. Blood smears were prepared from the aspirated portion, stained with Wright Giemsa stain (7) before being examined under the microscope using oil immersion. Sex chromatin of different shapes were counted in 300 polymorph nuclear leucocytes animal, the vertical and horizontal axis were determined together with their area (SCA) and nuclear area. Results were analyzed using computerized general linear model.

Results

- **Sex chromatin incidence in heifers:** It is shown in table 1, that percentage of sex chromatin occurrence in heifers is 6.9% distributed in 4 shapes . drum stick, small club, tear drop, and Sessile nodule with the following percentages for various shapes respectively : 2.64, 0.28, 1.42 and 2.57.
- **Sex chromatin incidence in adult cows:** Incidence of sex chromatin in adult cows was: 8.7%. This value is significantly ($P<0.05$) higher than in heifers (Table 1). Concerning various shapes of the sex chromatin no significant change was noticed between heifers and adult animals.
- **Sex chromatin dimensions and animal age:** Regardless of shape, the vertical & horizontal axis of the sex chromatin showed no significant difference between heifers and adult cows studies at different ages (Table 2). Nuclear area (NA), decreased significantly ($P<0.05$) at 4 years of age as compared to 5 and 6 years of age (Table 2). Ratio of NA/SCA revealed a significant ($P<0.05$) decrease at 0.5 and 4 years of age as compared to all other ages. SCA/NA decreased significantly ($P<0.05$) at 5 and 6 years of age as compared to 0.5 and 4 years of age (Table 2).
- **Sex chromatin % in adult cows:** The % of SC in fertile animals at all ages showed a significant ($P<0.05$) increase over infertile animals suffering from abortion, still birth and repeat breeder (Table 3). A similar trend was also seen when various shapes of SC was studied. The percentage of SC of drumstick shape and sessile nodules decreased significantly ($P<0.05$) in the infertile compared to the fertile cows.
- **Sex chromatin dimensions in adult cows:** No significant difference was seen in both the vertical and horizontal axis length in fertile as compared to infertile cows (Table 4). However SCA decreased significantly ($P<0.05$) in animals having dead birth in comparison with both fertile and other infertile cows. In animals suffering from abortion, NA increased significantly ($P<0.05$) over the fertile animals. The

ratio of NA/SCA decreased significantly ($P<0.05$) in animals suffering from abortion as compared with those having dead birth. The other ratio (SCA/NA) showed no significant difference neither when fertile animals are compared with the infertile nor when infertile animals were compared with each other (Table 4)

Table (1) Percentage of sex chromatin in polymorph nuclear leucocytes in Sharabi cows at different ages

Animal age (year)	Sex chromatin %	Drumstick %	Small club %	Tear drop %	Sessile nodule %
Heifers (0.5)	B 6.9	2:64	0.58	1.12	A 2.57
Adult (4,5,6 years) 4 years 5 years 6 years	7.45 A 7.96	3.35 3.66	0.37 0.3	0.87 1	2.86 A 3
	AB 7.4	3.2	0.4	1	A 2.79
	AB 7	3.2	0.4	0.6	A 2.8

- Values with different letters indicate a significant difference ($P<0.05$)

Table (2) Changes in sex chromatin dimensions , nuclear area (NA) , sex chromatin area (SCA) and their ratios in polymorph leucocytes of Sharabi cows at different ages

Animal age (year)	Vertical axis (m n)	Horizontal axis (m fj.)	Sex chromatin area (m)	Nuclear area(m JI)	NA/SCA	SCA/NA
0.5	A 1.35±0.43	A 1.3310.24	A 1.3410.64	A 30.4311.62	A 24.4213.06	A 4.0710.45
4	A 1.1910.29	A 1.2010.24	A 1.1510.43	B 26.2612.59	B 24.414.10	A 4.8210.55
5	A 1.27±0.37	A 1.2110.24	A 1.2410.51	A 31.6911.79	A 29.8113.71	B 3.0110.48
6	A 1.2110.28	A 1.1810.27	A 1.1710.53	A 31.6512.62	A 30.7515.20	B 2.9210.28

- Values carrying different letters indicate a significant difference ($P<0.05$)

Table (3) Sex chromatin percentages in the polymorph nuclear leucocytes of Sharabi cows both fertile and infertile

Animal state	Sex chromatin %	Drumstick %	Small club %	Tear drop %	Sessile nodule %
Fertile	A 8.7	A 4.1	A 0.5	A 0.9	A 3.2
Infertile: Aborted Dead birth Repeat breeder	B 6.0	B 2.5	A 0.7	A 0.8	B 2.0
	B 5.66	B 2.33	A 0.5	A 0.93	B 1.90
	B 5.66	B 2.35	A 0.65	A 0.66	B 1.8

Values with different letters indicate a significant difference ($P<0.05$).

Table (4) Changes in the dimensions of sex chromatin in fertile & infertile adult Sharabi cows including nuclear area (NA) ,sex chromatin area (SCA) and their ratios

Animal age (year)	Vertical axis (m ^)	Horizontal axis (m n)	Sex chromatin area (m n)	Nuclear area (m ^i)	NA/SCA	SCA/NA
Fertile	A 1.2510.35	A 1.2310.23	A 1.2610.61	B 30.7712.10	AB 28.8314.18	- A 4.3112.17
Aborted	A 1.11 ±(>.27	A 1.1810.33	A . 1.0610.35	A 36.0011 80	B 25.1514.54	A 3.1 IK). 55
Dead birth	A 1.1210.24	A 1.1310.32	B 1.0010.34	A 32.9212.33	A 32.9214.69	A 3.1510.29
Repeat breeder	A 1.2010.38	A 1.2510.24	A 1.2010.55	AB 32.4211.72	AB 28.5613.59	A 4.1310.91

Values with different letters indicate a significant difference (P<0.05)

Discussion

The significant increase in the incidence of sex chromatin in polymorph nuclear leucocytes with the advancement of age (from 0.5-4 year) agrees with that reported in the literature. It has been found that there is a steady increase in bovine sex chromatin with advancement of age (8,4). A similar observation has been reported in the sheep and goat (9,10). The reason behind the significant

decrease seen in nuclear area (NA) in cows 4 years old in comparison with subsequent ages is not known, however, it has been reported that cells having smaller nuclei tend to have a higher incidence of sex chromatin (11,12), a trend similar to what we have obtained in our study (Table 2). This change in nuclear area could have influenced both NA/SCA ratio (decreased significantly) and SCA/NA ratio (increased significantly) as compared to subsequent age (Table 2).

The significant decrease in sex chromatin % in infertile cows agreed with the result of other worker concerning other breeds of cows (12,13). A similar trend has also been reported in sheep & goats (10). It has been suggested that female animals suffering from certain reproductive problems have a delayed DNA synthesis from the inactivated chromosomes (12,14). More over, it has been reported that abnormal hormonal levels associated with certain reproductive problems may influence sex chromatin percentage and dimensions.

The significant decrease in drumstick % observed in infertile cows may be the main cause of the significant decrease in the total % of sex chromatin of these animals.

The Changes seen in nuclear area (NA) and NA/SCA ratio in infertile cows may be attributed to changes in sex chromatin %, which seem to have a negative relationship with nuclear area.

It was concluded from the study that the SC play arole in reproductive process and indicate the need for further studies to clarify changes in sex chromatin under various hormonal levels or in different reproductive pathological conditions.

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