Chromosomal changes in peoples consumed frozen meat in Al- Diwaniyah province

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Abstract

This study aimed to study chromosomal changes for people who eat frozen meat, the samples were collected from 30 people (males) aged 20-25 years from three different regions, they divided between , the city center and districts and rural areas in addition to control group who were 10 healthy people in the same sex and age and didnt eat frozen meat. Were prepared chromosomes from lymphoid peripheral blood cells, and then calculated changes in the chromosomes . The results of the study showed the presence of abnormalities in the chromosomes of people who lives in city center(third group) as compared to control where it reached 0.13 , but this different was not significant at the level ($p < 0.01$) changes of chromosomal aberration in first and second groups were 0.11 , 0.09 , but did not constitute significant differences. The types of malformations observed in the chromosomes of the study samples included : chromatide breack, chromatide delete , acentric fragmentes showed no numerical changes in the studied groups.

KeyWords: frozen meat, Chromosomal aberrations, blood ymphocytes.

التغيرات الكروموسومية لدى الاشخاص المستهلكين للحوم المجمدة في محافظة الديوانية

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الخلاصة

هدفت هذه الدراسة إلى دراسة التغيرات الكروموسومية للأشخاص الذين يتناولون اللحوم المجمدة في مدينة الديوانية ، حيث تم جمع عينات من 30شخص (ذكور) تتراوح اعمارهم من 20-25 سنة من ثلاث مناطق مختلفة توزعت بين مركز المدينة والاقضية والارياف بالاضافة الى مجموعة السيطرة وهم 10 أشخاص أصحاء لهم نفس الجنس ومتوسط العمر ولا يتناولون اللحوم المجمدة. تم تحضير الكروموسومات من الخلايا اللمفاوية للدم المحيطي، ومن ثم تم حساب التغيرات في الكروموسومات حيث أظهرت نتائج الدراسة وجود تشوهات في كروموسومات الأشخاص ساكني المدن (المجموعة الثالثة)مقارنة بمجموعة السيطرة وبقية المجاميع حيث بلغ 13ر0 لكنه لم يكن معنويا عند مستوى ($p<0.01$) كما لوحظت تغيرات كروموسومية طفيفة في المجموعة الاولى والثانية بلغت 11ر0 و 09ر0 لكنها لم تشكل فروقا ذات دلالة احصائية بالمقارنة مع مجموعة السيطرة ومن أنواع التشوهات التي لوحظت في كروموسومات عينات الدراسة: كسور كروماتيدية ,حذف كروماتيدي .شظايا كروموسومية كما لم تشاهد أي تغيرات عددية في المجاميع المدروسة .

كلمات مفتاحية : لحوم مجمدة ، تغيرات كروموسومية ، الخلايا اللمفاوية .

Introduction:

Meat is the president of food for human to contain important components such as proteins, carbohydrates, fats and minerals that the body needs to perform daily acts and metabolic processes [1]. Due to the fact of meat fast spoilage and corruption, so it was necessary to be stored using the methods of concervation such as canning salting, freezing; Because of development and scientific progress in the methods of processing and preserving of meat, freezing has become the most wide way in conservation of meat for its efficiency and importance [2] in addition to stop most of the enzymatic and microbial agents [3]. In spite of the important of meat , it is a risk source to public health , freezing causes undesirable changes in color, flavor and smell also causes transformation of unsaturated fatty acids and cholesterol that causing adverse effects to humans health [4] the most important of these effects are influencing in the genetic material, so this study was designed for the purpose of knowledge the effect of consume frozen meat in human lymphocytes chromosomes .

Materials and methods

Blood Samples had been collecting by vein puncture , The information from the groups that have the were investigated by a questionnaire . Blood was drawn into heparin-coated syringe from a sample of 40 male from 3 different areas belonging to the province of Diwaniya ,the first group was districts the second was rural area and the third was the city center .

Blood culturing

Blood culturing was performed in the laboratory of the department of biology at the University of Qadisiya under sterile conditions. The procedure of Yaseen (1990)[5] was followed, added to the tube (6) drop of the blood of all the container tube 5 ml of growth medium (RPMI-1640), and then (0.3) ml of substance (PHA) and close the tube and mix the contents thoroughly and incubated in temperature (37 C°) for (72) hour with shake pipe quietly at least twice every 24 hours during the period of incubation .

Harvesting cells

1. (0.1) ml of colchicin was added to each culture tube before the expiry of the incubation with a gentle mixing, and after incubation, the tube was centrifuged (1000 rpm/minutes) for 10 minutes, and the supernatant was discarded.

2. The cell deposit was suspended in 10 ml of KCl hypotonic solution concentration (0.075 M) , and was incubated in a water bath (37ºC) for 15 minutes, with a gentle mixing every 5 minutes then the mixture of cells was separated by centrifugation (1500) rpm for 10 minutes.

3.Five ml of freshly prepared fixative were added a drop-wise, and the deposit was gently suspended.

4.The tube was incubated at 4ºC for 15 minutes, and then centrifuged (1000 rpm/minutes) for 10 minutes, and the supernatant was discarded
This step were repeated twice, and then fixed, the cell pellet was suspended in 1 ml of fixative.

5.Few drops (3-5) were dropped on two pre-washed slides from a height of about 3 feet, and the slide was air-dried.

6.The slide was stained with Giemsa stain for 15 minutes and then washed with distilled water and left for air-drying, then slides were checked with microscope All slides were coded and analyzed 100 cell spread metaphase screened for each individuals[6] and counting the chromosomal changes which include : chromatid breaks, chromatid deletion and acentric fragmentes(photograph 2,3,4) .

Statistical analysis:

The data were analyzed with Spss programme .The significance of difference between the groups were assessed by Duncan test.

Results and discussion

Numerical and structural changes of peripheral blood lymphocytes were studied in three region to see the effect of frozen meat consumption on human chromosomes in lymphatic blood cells chromosomes are compared with the control group, the study Showed no numerical chromosome abnormalities. In the control group only chromatid breack were recorded and no deformities of other structural features as in figure (1) while in the three group chromatid breack , acentric fragmentes , and chromatid deletion were recorded table (2) . Table(1) showed the rate of chromosomal changes in control and three group that reach to 0.02 in the control group, while it was a slightly increased in the first group r(0.11) second group (0.09) and (0.13) in the third group table(1) . These change were not significant compared to the control group at the level of probability ($P \leq 0.01$).

The first effect which happened in DNA may be occur in single or double chain, transversal links may be occur between molecules of DNA with each other and can get breaking bonds existed between sugar molecules and the phosphate group on a chain of DNA, and these errors may corrected by DNA repair systems while in case of non-fixed or repaired incorrectly they lead to the mutations [7].

Several Researcher consider cytogenetic biomonitoring as a valuable index of exposure to genotoxic and carcinogens and as a predictor of cancer risk , chromosomal abnormalities were implicated in initiation and progression of many types of cancers [8] and[9] .

Further studies are needed to analyze the nature of the chemical components that cause chromosomal damage and link the various chromosomal aberrations with increased risk of cancer and other diseases and we need to study the level of hormones in the individuals that consumes frozen meat .

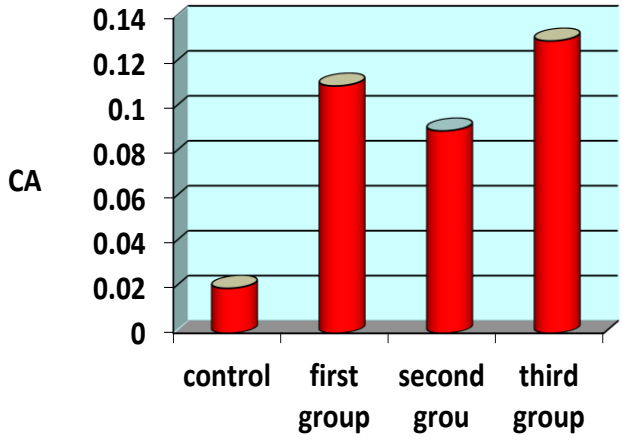
Table (1) Total Chromosomal aberration in blood lymphocytes of groups

group	**Chromosomal aberration** **CA±SE %**
control	0.02 ±0.3 a
first group	0.11 ±0.75 a
second group	0.09 ±0.50 a
third group	0.13 ±0.45 a

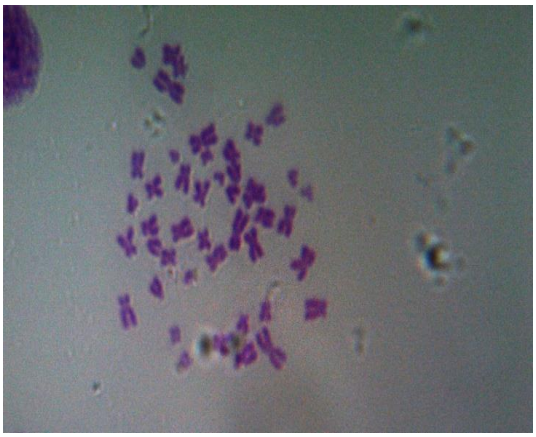
Similar letter refers no differences between studied groups at level of probability (P≤ 0.01)level.

Table(2) Type and frequency of chromosomal aberrations precentage in the study groups

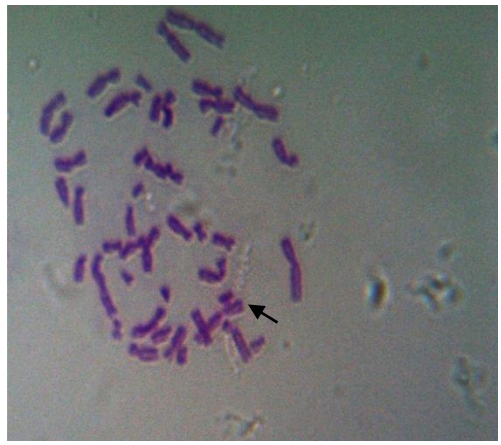
group	Chromatid breaks	Chromatid deletion	Acentric fragmentes	Total aberration%
control	0.01	0.00	0.01	0.02
first group	0.06	0.02	0.03	0.11
second group	0.04	0.03	0.02	0.09
third group	0.05	0.01	0.06	0.13



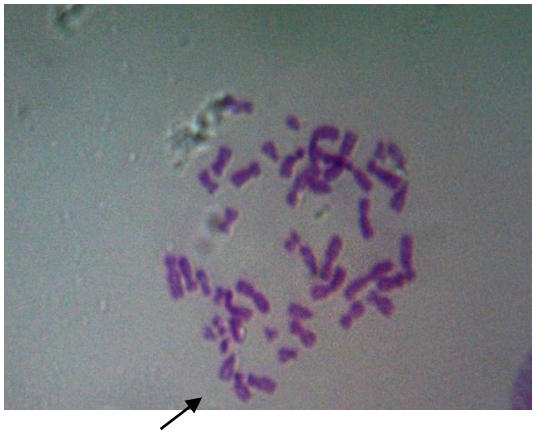
Figer (1) Chromosomal aberration in blood lymphocytes of groups



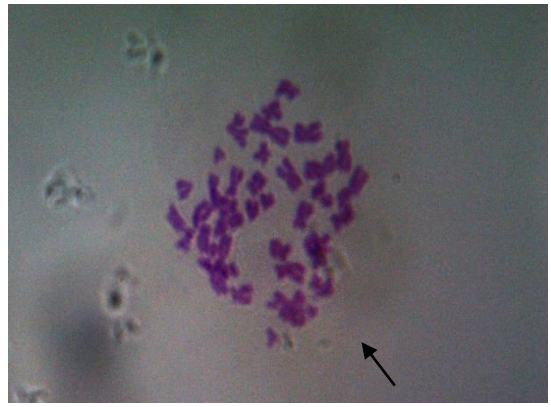
Photograph(1)Normal chromosomes



Photograph(2) Chromatid break



Photograph(3)Acentric Fragment



Photograph(4) Chromatid deletion

References

1-Hassan, Abdul Wahid Ahmad (1992). Screening for the presence of some bacterial food poisoning in the carcasses of cows and sheep. Master, Veterinary Public Health, College of Veterinary Medicine, University of .Mosul.

2 -Humberto, J.; Murueta, C.; Los, A.; Toro, M. & Garci, N. F. (2007). Concentrates of fish protein from by catch species produced by various drying processes. Food Chem., 100:705-711.

3-Abboud, Akram Rishan (1987). Principles of meat hygiene. National printing and publishing. University of Al Mosul. Library for

-Daramola, J. A.; Fasakin, E. A. & Adeparasi, E. O. (2007). Change in 4

physicochemical and sensory characteristics of Smoke- dried fish species

stored at ambient temperature. African J. of Food Agr. Nutr. And Dev., 7

(6):184-200 .

5-Yaseen, N.Y. (1990). *Cytogenetic Study of Human Colorectal Cancer cell*. Ph. D. Thesis, Univesrsity of Sheffield, England.

6-Gokalp, F. D. and Kaymak, F. (2002). The cytogenetic effect of Maleic Hydrazide in human lymphocytes culture. Serisi, Cilt 3, No 2: 141-147.

7-Ramirez, V. and Cuenca, P. (2001). Micronuclei frequency in lymphocytes of individuals occupationally exposed to pesticides. Rev. Biol. Trop. 49: 32-44.

Hagmar L., Stromberg U. , Montagud H., Tinnerberg H., Forni

8-Bonassi S. , Heikkila P. (2000) Chromosomal aberration in lymphocytes predict human cancer independently of exposure to carcinogens. Cancer Research, Vol.60, P:1619

9-Hagmar L., Stromberg U., Bonassi S., Hansteen L., Knudsen E., Lindholm C -and Norppa H. (2004). Impacts of types of lym phocyte chromosomal aberrations on human cancer risk: results from Nordic and Italian cohorts, , Vol.64, P: 2258. Cancer Research.