Academic Sciences **Asian Journal of Pharmaceutical and Clinical Research**

Vol 5, Issue 1, 2012 ISSN - 0974-2441

Research Article

EFFECT OF SODIUM AND POTASSIUM IONS IN IDENTIFICATION OF BABY GENDER IN HAMSTER

S. CHANDRAJU[1]*, ASHRAF BEIRAMI[1] AND C. S. CHIDAN KUMAR[2]

[1]**Department of Studies in Sugar Technology, Sir M. Vishweshwaraya Post-Graduate Center, University of Mysore, Tubinakere 571402, Mandya, Karnataka, India ,[2]Department of Chemistry, G. Madegowda Institute of Technology, Bharathi Nagar 571422, Mandya, Karnataka, India. Email:** chandraju1@yahoo.com

Received: 07 October 2011, Revised and Accepted: 21 November 2011

ABSTRACT

Effects of Sodium and Potassium in diet to determine baby gender in hamster have been investigated. Diabetes mellitus is a chronic, widely spread disease in living species. Sex determination has scientific basis for prevention of genetic diseases in addition to social backgrounds.36 hamsters (obtained from veterinary college Bangalore), were divided in to three groups in the ratio male to female 1:5. The first group was made diabetic with Na and K, the second group was non diabetic with Na and K, group third was control unit (Non-diabetic without Na and K). It was found that the delivered offspring's male to female ratio were 4:1, 3.6:1 and 1.02:1 for the first, second and third groups respectively. Also, it was found that non diabetic hamster fed with normal food yields maximum numbers of offspring (83), while diabetic hamster fed with Na and K yields and diabetic hamster with Na and K yield lowest numbers of offspring (50).

Keywords: sodium, potassium, diabetes, sex ratio, hamster.

INTRODUCTION

Pregnancy is a state that allows a life form to develop with the support and protection of its mother's body. The growth and development of the fetus in gestation is partially determined by the genome of the fetus, which produces its own growth factors as well as the majority of its hormones. However, this genetic influence is highly dependent on interaction with environmental factors[1]. One factor is vital in the growth and development of the fetus is nutrition. The fetus is solely dependent on the mother to supply its nutrients. It is also dependent on the placenta, an essential organ in pregnancy, to transfer these nutrients from the maternal system to its own. Thus the fetal nutrition is a reflection of that of the mother's. This interaction exists in a sensitive equilibrium; if disturbed, there are fetal developmental consequences[1]. Pre-selection of the gender of offspring is a subject that has held man's attention since the beginning of recorded history. Although scientific studies on genes have been conducted recently, sex selection and gender preference have been considered since ancient time. Anaxagoras, a Greek scientist was the first person who related the sex of fetus to testis[2].

Pre-selection of gender of offspring is a subject that has held man's attention since the beginning of recorded history. While the natural sex ratio at birth is usually 104–107 males to 100 females[3], in Chinese census data show that 20 years ago there were 108 males under the age of 5 for every 100 females, and that by 2000 this ratio had shifted to 117 males to 100 females, with some regions reporting ratios of130.and. In the Indian census of 2001 the sex ratio in the age group 0-6 was 117.8, with some northern states such as Punjab having ratios as high as 120-125[4]. These trends are mirrored in other Asian countries such as South Korea and Taiwan, which have sex ratios at birth of 108 and 109 respectively.

There are many reasons for sex determination that the strongest predictor of uneven sex ratio for a given parity is the sex composition of previous children[5,6,7]. For families without a male, the higher the parity, the higher the probability of having a male as the next birth. The propensity to use sex selection increases with socio-economic status, especially education, and the proportion of males to females is larger in cities than in rural areas[5,6]. Despite a large demographic literature on the relation between male preference and fertility stopping behavior[8] there is little formal analysis of the link between fertility and sex selection[9]. For India, it has been argued that fertility decline increases the bias against girls[10], but the stated preference for sons also appear to decline with lower desired fertility[11]. In Korea simulations suggested that introduction of sex selection changed family size little, but did result in abortions of female fetuses equal to about five percent of actual female births[9]. For China allowing a three-child policy has been predicted to increase the fertility rate by 35 %, but also reduce the number of female aborted by 56 %[12]. Most of the sex selection in China is due to parents' with low levels of education[12]. Data presented in table 4 shows that non diabetic (Na, K) group and diabetic (Na, K) group had the highest male while neither diabetic nor (Na, K) Group there was no different between their sex. These findings agree with reports foe preconception of sex in sows and man reported[13].

There are many methods of sex selection such as: The consumption of particular foods, the use of various vaginal douches and the timing of intercourse in relation to ovulation, sperm sorting, pre-implantation genetic diagnosis (PGD), selective abortion, Infanticide, Periconceptual methods, postconceptual methods. There are also methods which use different food combinations and special diets to maximum the chance of having a baby with specific sex. The old believe is that eating salty, savoury foods leads to delivering a male and calcium rich foods to a female. Some believes that the ratio of the minerals sodium, potassium, calcium and magnesium are important in determination of baby gender. It was shown that pregnant female house mice maintained on a consistent low-food diet give birth to a lower proportion of males than control females fed ad libitum[14]. The diet may influence the conditions within the reproductive tract and the outer barrier surrounding the ovum, enabling only one of the two types of sperm to penetrate the depending on which diet is adhered to. Langdon and Proctor first published the preconception Gender Diet `based on results reported the theory is that, by altering your diet to include and exclude certain foods, the conditions in the reproductive tract will be directly affected, increasing the odds of conceiving a particular sex.

On continuation of our work[13,15], in the present study, we induce diabetes with Streptozotocin, to study the effects of adding mono-valent ions (sodium and potassium) in drinking water of hamster, offspring sex was investigated.

MATERIALS AND METHODS

Streptozotocin or Streptozocin or Izostazin or Zanosar (STZ) is a synthetic antineoplastic agent that is classifically an anti-tumor antibiotic and chemically is related to other nitrosureas used in cancer chemotherapy. Streptozotocin sterile powders are provided and prepared as a chemotherapy agent. Each vial of sterilized Streptozotocin powder contains 1g of Streptozotocin active ingredient with the chemical name, 2-deoxy-2-[(methylnitrosoamino) - carbonyl] amino-D-glucopyranose and 200 mg citric acid. Streptozotocin was supplied by Pharmacia Company. Streptozotocin is available for intravenous use as a dry-frozen, pale yellow, sterilized product. Pure Streptozotocin has alkaline pH. When it is dissolved inside the vial in distilled water as instructed, the pH in the solution inside the vial will be 3.5-4.5, because of the presence of citric acid. This material is prepared in 1-g vials and kept in refrigerator temperature (2-8 °C) away from light. Control animals were given an equivalent volume of citrate buffer solution.

Animals

36 Adult female hamster weighting 150-180g (42-56 days old) and still in their reproductive phase , were kept under constant conditions of light (12 h light-dark cycle) and humidity, fed with standard laboratory chow ad libitum (Trouw, Gent, Belgium), and had free access to tap water. Before initiation, the hamsters were allowed to adapt for one week. The hamsters were then weighed, and blood sample was tested for glucose and insulin levels. Vaginal wet smears were made to determine the estrous cycle of the hamsters. On the evening before estrus, female hamsters were housed overnight with male hamster; the presence of spermatozoa in a vaginal smear the next morning was defined as day one of pregnancy.

Experimental design

To Induction of diabetes, hamsters were fasted for 12 h before inducing diabetes, 10 adult hamsters weighting 150-180 g (42-56 days old) were used for inducing diabetes. The hamsters were injected by a single intra-peritoneal streptozotocin at the dose of 40 mg/kg of the body weight. STZ was freshly dissolved in 0.05 M citrate buffer, pH 4.5. For the i.p. injection of STZ, the hamsters was held in one hand in dorsal position, the injection site was swabbed using povidone- iodine solution and the designated amount of STZ was injected within 10' after preparation in the caudal abdominal cavity using sterile 25g insulin needle. Streptozotocine induces diabetes within 3 days by destroying the beta cells[3]. Tail blood was collected for glucose determination using a glucometer (Accutrend Glucose, Roche Diagnostics, and Mannheim, Germany). Blood glucose levels were measured on the third day, STZinjected rats with blood glucose levels 15 m mol/l (270mg/dl) as well as polydipsia, polyuria and polyphagia for at least one week were considered to be diabetes (STZ rats).10 control hamsters [non diabetic (Na, K) and 10 neither diabetic nor (Na, K) were injected with an equal volume of citrate buffer solution.

Diabetic hamsters and non-diabetic control group were kept in metabolic cages individually and separately and within 16-21 days, on the specified diets (Na, K and non Na, K) feeding and metabolism control (1.5g Na /kg and 6.0 g K/kg) [Table 1]. The first group diabetics (Na, K)and second group non diabetics (Na, K) was supplied with drinking water mixed with 1% sodium and potassium, the third group was chosen as a control group neither diabetics nor Na& K, pure drinking water was supplied. After 16-21 days, on the specified diets, the hamsters at the oestrus stage of the reproductive cycle were caged with male hamsters for mating and gestational day 1, was confirmed on the observation of a vaginal plug. At postnatal day two, the number of litters and the gender of pups were recorded. Pups were sexed by means of the ano-genital distance, which is longer in males[16]; this was confirmed in later examinations during pre weaning development.

STATISTICAL ANALYSIS

The data were entered and analyses by SPSS software using T-test and the p-value less than 0.05 were considered as significant.

RESULTS AND DISCUSSION

It was found that, in the first group diabetic mothers (Na & K), all of the 10 hamsters became pregnant which delivered 50 offspring. Their gender was 40 male (80%) and 10 female (0%). In the second group, non diabetic (Na, K), all of the 10 hamsters became pregnant and delivered 70 offsprings, their gender was 55 male (78.58%) and 15 female (21.42%) and in the third group, neither diabetic nor (Na, K) all 10 hamsters became pregnant and delivered 83offsprings that 42 male (50.60%) and 41female (49.40%) (Table-2). The sex ratio of male to female in the first group of diabetic mothers (Na, K) and in the second group, non diabetic (Na, K) were 4:1-3.6:1, While this ratio in the third group, neither diabetic nor (Na, K) was1.02:1 respictively (Figures - 1 and 2). The percentage of the male offspring of diabetic mothers (Na, K) [78.58%] was higher than the male offspring in control group [50.60%] and also male offspring of non diabetic mothers (Na, K) [78.58%] was higher than the male offspring in control group [50.60%] (Figure -3). The difference in the sex ratio between the first group diabetic mothers (Na, K) and the second group non diabetic mothers (Na, K) was not statistically significant (p-value - 1.11), while the difference between the group of diabetic mothers (Na, K) with control group (p-value - 35.2) and between group non diabetic mothers (Na, K) with control group (p-value -29.76) were statistically significant (Table-1). The Total no of offspring in the first group diabetic mothers (Na, K) (50, 24.63%) was lower than total no of offspring the second group, non diabetic (Na, K) [70, 34.48%] and also in the third group, neither diabetic nor Na, K [83, 41%] (Figure -4). Body weight in STZ-induced diabetes group increased from 160.15g to180.15g, while that of the control group increased from 160.15g to 200.13g on the day of experiment.

Table1: Estimated Minerals Requirements of adult Mice and Human

Mouse** (g/KG) Minerals	Amount Per Kg diet	Human* (mg-ug/day)
Calcium	5.0	1000
Chloride	0.5	750
Magnisium	0.5	2-5
Phosphorous	3.0	700
Sodium	0.5	500
Potassium	2.0	2000
Iron	35.0	8
Manganese	10.0	2-5
Zinc	10.0	10-12
Iodine	150.0	150-150
Molybdenum	150.0	75-250(ug)

****adapted from Nutrient Requirements of Nonhuman Primates.**
*** Adapted from Lanus Micronutrient information Center, Oregon State Unit**.

CONCLUSION

Results of this research indicated that parents fed (Na & K) rich ratios tended to have male progeny. The consumption of particular foods, the use of various vaginal douches and the timing of intercourse in relation to ovulation are some of the many methods believed to influence whether a female or a male is conceived. Today one of good known methods on sex constitution is the preconception diet method. The theory is that by altering your diet to include and exclude certain food, the condition in the reproductive tract will be directly affected; increasing the odds of conceiving a particular sex it is also recommended that both mother and father go on the diet. The diet may influence the conditions within the reproductive tract and the outer barrier surrounding the ovum enabling only one of the two types of sperm to penetrate the depending on which diet is adhered to. This method under scrutiny claims of 80% accuracy based on one clinical trial of only 260 mothers, the results were published in the international journal of Gynecology and Obstetrics in 1980. The male diet is high in salt and potassium but low in sodium, calcium, magnesium and contains alkali-forming foods.

Table 2: Sex ratio in different groups of hamster

Group	Total no of offspring	No. of male offspring	% age of male offspring	No. of female offspring	% age female offspring	Sex ratio
Diabetic (Na, K)	50	40	80	10	20	4
Non diabetic (Na,K)	70	55	78.58	15	21.42	3.6
Neither diabetic nor Na, K	83	42	50.60	41	49.40	1.02

Thus the present study successfully elevates the relationship between minerals and sex ratio in hamster and human. The diets nutritional content is questionable and contains multiple warnings. It is recommended to seek the advice of medical practitioner before going on such a restrictive diet, and stay on the diet for no longer than 3 months.

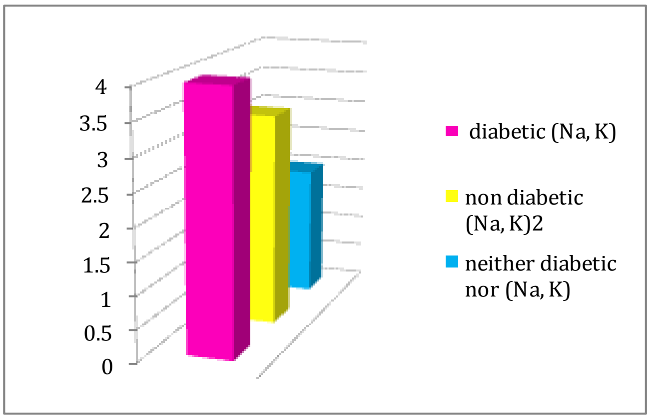

Fig 1: Male and female in different groups of hamsters.

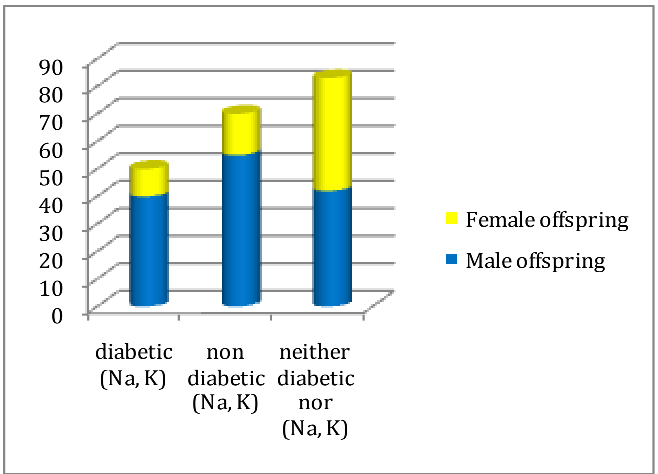

Fig 2: Male and female in different groups of hamsters.

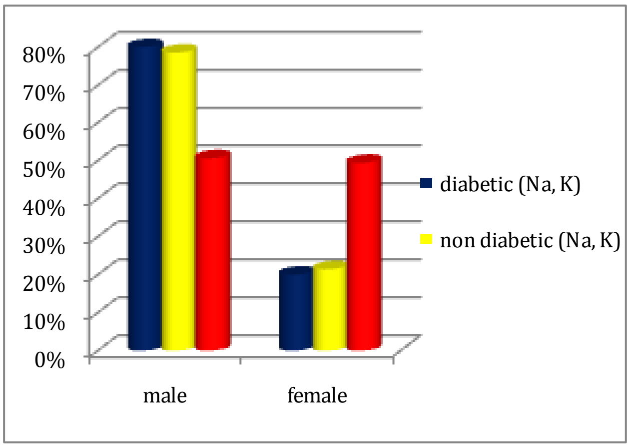

Fig 3: Offspring sex in different groups of hamsters.

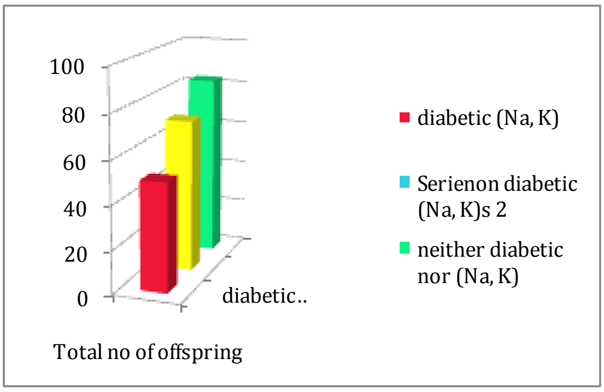

Fig4: Number of offspring in different groups of hamsters.

REFERENCES

1. Van Assche, F., K.Holemans, and L.Aerts. Long-term consequences for offspring of diabetes during pregnancy. British Medical Bulletin. 2001. 60; 173-182.
2. Mittwoch, U. Sex in mythology and history. Arq Bras Endocrinol Metab. 2005. 49; 7-13.
3. Retherford., D. Robert and T K Roy. 2003. Factors Affecting Sex-Selective Abortion in India and 17 Major States, National Family Health Survey Subject Reports 21, International Institute for Population Sciences, Mumbai, India January.
4. Jha, Prabhat, Rajesh Kumar, Priya Vasa, Neeraj Dhingra, Deva Thiruchelvamand Rahim Moineddin. 2006. Low male-to-female [sic] sex ratio of children born in India: national survey of 1.1 million households, Lancet 367: 211–218.
5. Abrevaya, J. Are There Missing Girls in the United States? Evidence from Birth Data, American Economic Journal: Applied Economics. 2009. April 1(2): 1–34.
6. Clark, S. 2000. Son Preference and Sex Composition of Children: Evidence from India, Demography 37(1): 95–108.
7. Park, Chai Bin and Nam Hoon Cho.1995.Consequences of Son Preference in a Low-Fertility Society: Imbalance of the Sex Ratio at Birth in Korea. Population and Development Review.
8. Gupta, D., Monica and P N. Mari Bhat.1997.Fertility Decline and Increased Manifestation of Sex Bias in India, Population Studies 51 (3), 307–315.
9. Bhat, P N Mari .2006. Sex Ratio in India: Correspondence, Lancet 367:9524, 1725–1726. And A J Francis Zavier. 2003. Fertility Decline and Gender Bias in Northern India. Demography, November 40 (4): 637–657.
10. Ebenstein, Y.Avraham. 2009. Estimating a Dynamic Model of Sex Selection in China, Demography, March, Forthcoming.
11. Bolet,G.,L.Gueguen,P.Dando and L.Ollivoer. Influence of mineral diet of the sow on the sex ratio of the newborn .Reported. Nutr. Dev. 1982; 22;1073-81
12. Judith Daar, ART and the Search for Perfectionism: On Selecting Gender, Genes, and Gametes, 9 J. GENDER RACE & JUST. 241, 265–66 (2005).
13. Chandraju S, Ashraf Beirami, Chidan Kumar CS. Role of Sodium and Potassium ions in identification of baby gender in High-sugar mammals. Int J Pharm Pharm Sci. 2011; 3(4); 303-306.
14. Tarin, J.J., S. Perez-Albala, A. Aguilar, J. Minarro, C. Hermenegildo and A. Cano. Long-Term Effects of Postovulatory Aging of Mouse Oocytes on Offspring: A Two-Generational Study. Biol. Reprod. 1999; 61; 1347-1355.
15. Chandraju S, Ashraf Beirami, Chidan Kumar C S. Effect of calcium and magnesium in identification of baby in highsugar mammals. Research in Biotechnology. 2011; 2(3); 23-31.
16. Bhaskar, V., and B. Gupta. India.s Missing Girls: Biology, Customs and Economic Development, Oxford Review of Economic Policy. 2007; 23; 221- 238.