Academic Sciences International Journal of Pharmacy and Pharmaceutical Sciences

ISSN- 0975-1491 Vol 3, Issue 4, 2011

Research Article

ROLE OF SODIUM AND POTASSIUM IONS IN IDENTIFICATION OF BABY GENDER IN HIGH-SUGAR MAMMALS

S. CHANDRAJU*, ASHRAF BEIRAMI AND C. S. CHIDAN KUMAR‡

Department of Studies in Sugar Technology, Sir M. Vshweshwaraya Post-Graduate Center, University of Mysore, Tubinakere 571402, Mandya, Karnataka, India, ‡Department of Chemistry, Bharathi College, Bharathi Nagar 571422, Mandya, Karnataka, India. Email: chandraju1@yahoo.com

Received: 27 July 2011, Revised and Accepted: 1 Sep 2011

ABSTRACT

Effects of Sodium and Potassium in diet to determine baby gender in high-sugar mammals 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.60 rats (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 male to female ratio were 4.3:1, 3.3:1 and 1.03:1 for the first, second and third groups respectively. Also, it was found that non diabetic rats fed with normal food yields maximum numbers of offspring (217), while non diabetic rat fed with Na and K yields 200 and diabetic rats with Na and K yield lowest numbers of offspring (144).

Keywords: Sodium, Potassium, Diabetes, Sex ratio, Wistar rat.

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 off-spring 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].

There are many methods of sex selection such as: The use of various vaginal douches, the timing of intercourse in relation to ovulation, sperm sorting, pre-implantation genetic diagnosis (PGD), selective abortion, Infanticide, Preconception methods and postconception methods. There is little evidence that these methods significantly alter the ratio of male to female births.

Today one of good known methods on sex constitution is the preconception diet method. The use of different food combinations and special diets leads to the maximum 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[4]. 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[17] 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. This method claims 80% accuracy and 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. This is also consistent with the oriental philosophy that everything has a yin or yang quality and the foods supplied in the male diet, males, and alkaline are yang. The male diet is high in salt and potassium but low in calcium and magnesium and contains alkali–forming foods. The diets nutritional content is questionable and contains multiple warnings.

On continuation of our work[18], in the present study, we induce diabetes with Streptozotocin to study the offspring sex upon adding mono-valent ions (sodium and potassium) in drinking water of rats.

MATERIALS AND METHODS

Streptozotocin or Streptozocin or Izostazin or Zanosa (STZ) is a synthetic antineoplastic agent that is classifically an anti-tumor antibiotic and chemically is related to other nitro urea's 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-({[methyl(nitroso)amino]carbonyl}amino)-*alpha*-D-glucopyranose and 200mg citric acid. Streptozotocin was supplied by Pharmacia Company. 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 1g vials and kept in refrigerator temperature (2-8 °C) away from light. Control animals were given an equivalent volume of citrate buffer solution.

Animals

60 Adult female Wistar weighting 100-130g (70-80 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 rats were allowed to adapt for one week. The rats 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 rats. On the evening before oestrus, female rats were housed overnight with male rats; the presence of spermatozoa in a vaginal smear the next morning was defined as day one of pregnancy.

Experimental design

To induce diabetes, 20 adult Wistar rats weighting 100-130g (75-90 days old) were fasted for 12h. The rats were injected by a single intra-peritoneal streptozotocin at the dose of 40 mg/kg of the body

weight. STZ was freshly dissolved in 0.05M citrate buffer, pH 4.5. For the i.p. injection of STZ, the rat 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. Streptozotocin induces diabetes within 3 days by destroying the beta cells[5]. 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, STZ injected rats with blood glucose levels 15 m mol/l (270 mg/dl) as well as polydipsia, polyuria and polyphagia for at least one week was considered to be diabetes (STZ rats). 20 control rats [non diabetic (Na & K) and 20 neither diabetic nor (Na & K)] were injected with an equal volume of citrate buffer solution.

Table 1: 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
Magnesium	0.5	2-5
Phosphorus	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.

Diabetic rats and non-diabetic control group were kept in metabolic cages individually for 15 days on the specified diets (Na & K and non Na & K) with feeding and metabolism control (1.5 g Na/kg and 6.0g 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 for which pure drinking water was supplied. After 15 days on the specified diets, the rats at the estrus stage of the reproductive cycle were caged with male rats 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 anogenital distance, which is longer in males[6]; 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), 18 rats out of 20 became pregnant which delivered 144 offspring. Their gender was 117 male (81.25%) and 27 female (18.75%). In the second group, non diabetic (Na & K), all of the 20 rats became pregnant and delivered 200 offspring's, their gender was 153 male (76.5%) and 47 female (23.5%) and in the third group, neither diabetic nor (Na & K) all 20 rats became pregnant and delivered 217 offspring's that 110 male (50.70%) and 107 female (49.30%). As shown in Tab.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 4.3:1-3.32:1, while this ratio in the third group, neither diabetic nor (Na or K) was 1.03:1 respectively (Figs. 2 & 3). The percentage of the male offspring of diabetic mothers (Na & K) [81.25%] was higher than the male offspring in control group [50.70%] and also male offspring of non diabetic mothers (Na & K) [76.5%] was higher than the male off-spring in control group [50.70%]. As shown in Fig. 4. 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. As shown in Table 2. The Total no of offspring in the first group diabetic mothers (Na& K) (144, 25.67%) was lower than total no of offspring the second group, non diabetic (Na& K) [200, 35.65%] and also in the third group, neither diabetic nor Na, K [217, 38.68%]. As shown in Fig. 5. Body weight in STZ-induced diabetes group increased from 115.15g to130.15g, while that of the control group increased from 115.15g to 265.13g on the day of experiment.

Table 2: Sex ratio in different groups of rats

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)	144	117	81.25	27	18.75	4.5
Non diabetic (Na& K)	200	153	76.5	47	23.5	3.25
Neither diabetic nor Na& K	217	110	50.70	107	49.30	1.03

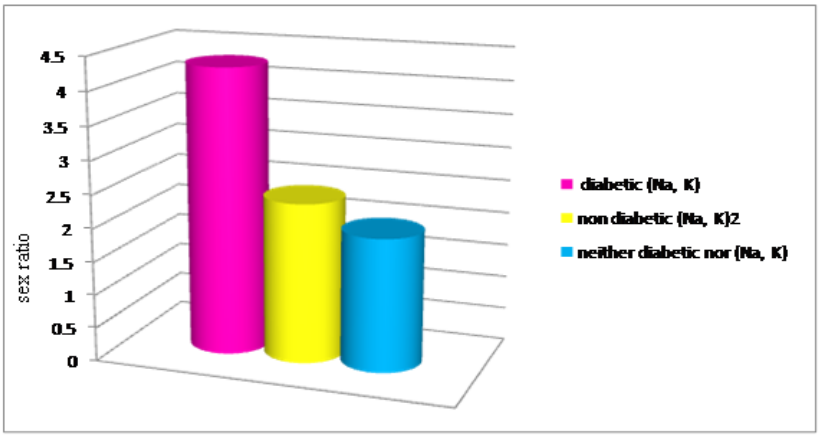

Fig. 2: Male and female in different groups of rats

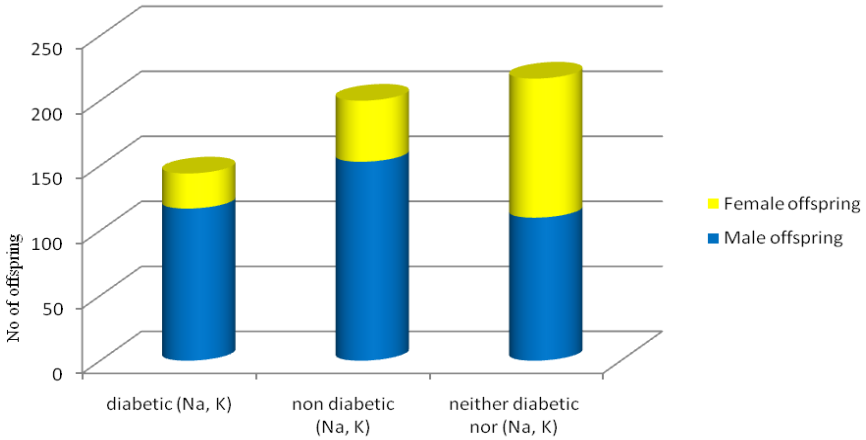

Fig. 3: Male and female in different groups of rat

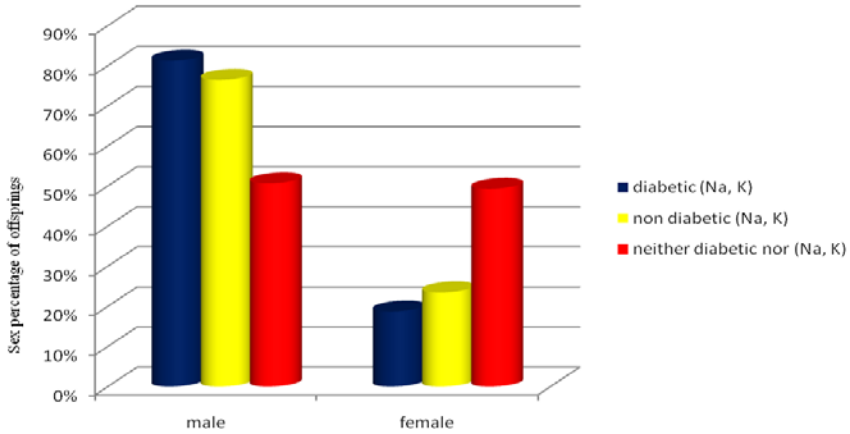

Fig. 4: Offspring sex in different groups of rats

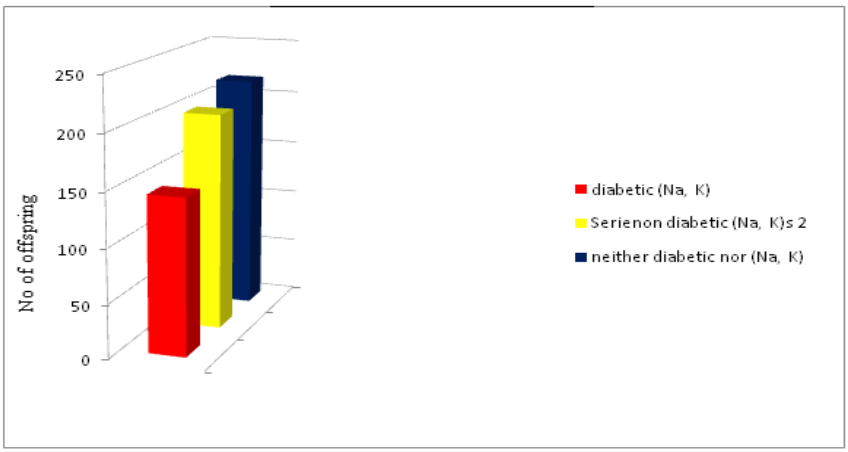

Fig. 5: Number of offspring in different groups of rats

The natural sex ratio at birth is usually 104–107 males to 100 females[7]. 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[8]. 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[9,10,11]. 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[9,10]. Despite a large demographic literature on the relation

between male preference and fertility stopping behavior[12] there is little formal analysis of the link between fertility and sex selection[13]. For India, it has been argued that fertility decline increases the bias against girls[14] but the stated preference for sons also appear to decline with lower desired fertility[15]. 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 .this finding agree with reports foe preconception of sex in sows and man reported[16]. Results of this research indicated that parents fed (Na & K) rich ratios tended to have male progeny.

CONCLUSION

The diet influences the condition of the cervical mucus within the reproductive tract and follicular fluid. Depending upon which diet is adhered enables one of the two types of sperm to penetrate the egg. Thus the present study successfully elevates the relationship between minerals and sex ratio in mice and human. However, it is recommended to seek the advice of the medical practitioner before going on such a restrictive diet, and stay on the diet for no longer than 3 months.

REFERENCES

1. Van Assche F, Holemans K, Aerts L. Long-term consequences for offspring of diabetes during pregnancy. British Medical Bulletin. 2011; 60; 173-182.
2. Mittwoch U. Sex in mythology and history. Arq Bras Endocrinol Metab. 2005; 49; 7-13.
3. Ornoy A, Ratzon N, Greenbaum C, Peretz E, Soriano D, Dulitzky M. Neurobehaviour of school age children born to diabetic mothers. Archives of Disease in Childhood. Fetal and Neonatal Edition. 1998; 79; 94-99.
4. Meikle D.B, Thornton M.W. Premating and gestational effects of maternal nutrition on secondary sex ratio in house mice. J. Reprod.Ferti. 1995; 105;193-196.
5. Karunanayake EH, Hearse D J, Mellows G. The metabolic fate and elimination of streptozocine. Biochemical Society Transactions. 1975; 3; 410-14.
6. Tarin J.J, Perez-Albala S, Aguilar A, Minarro J, Hermenegildo C, Cano A. Long-Term Effects of Postovulatory Aging of Mouse Oocytes on Offspring: A Two-Generational Study. Biol. Reprod. 1999; 61; 1347-1355.
7. Visaria P. The sex ratio of the population of India and Pakistan and regional variations during 1901–61. In: Bose A, editor. Patterns of population change in India 1951–61. Allied Publishers P. 1967; 334–71.
8. Bhaskar V,Gupta B. India.s Missing Girls: Biology, Customs and Economic Development, Oxford Review of Economic Policy. 2007; 23; 221- 238.
9. Retherford, Robert D, Roy T K. 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. 2007.
10. Jha, Prabhat, Kumar R, Vasa P, Dhingra N, Thiruchelvam D, Moineddin R. Low male-to-female [sic] sex ratio of children born in India: national survey of 1.1 million households, Lancet. 2006; 367; 211–218.
11. Abrevaya J. Are There Missing Girls in the United States? Evidence from Birth Data, American Economic Journal: Applied Economics, April. 2009; 1:2; 1–34.
12. Clark, Shelley. Son Preference and Sex Composition of Children: Evidence from India, Demography. 2000; 37; 1, 95–108.
13. Park, Bin C, Cho N. Consequences of Son Preference in a Low-Fertility Society: Imbalance of the Sex Ratio at Birth in Korea, Population and Development Review. 1995.
14. Gupta D, Monica, Mari Bhat P N. Fertility Decline and Increased Manifestation of Sex Bias in India, Population Studies. 1997; 51:3; 307–315.
15. Bhat, Mari P N. Sex Ratio in India: Correspondence, Lancet. 2006; 367:9524; 1725–1726. and Francis Zavier A J (2003) Fertility Decline and Gender Bias in Northern India, Demography, November40 :4, 637–657
16. Bolet G,Gueguen L ,Dando P ,Ollivoer L. Influence of mineral diet of the sow on the sex ratio of the newborn .Reported.Nutr.dev. 1982; 22; 1073-81.
17. Stolkowskowski J,Lorrain J. preconceptional selection of Fetal Sex.int. J.Gynaecol. Obstet. 1982; 18; 440-3.
18. 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.