



A Review on *Mamsa* as a *MatrujaBhava* in the Context of Gene Mutation in X chromosome and Mitochondrial DNA

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Abstract

Mamsa is a Matrujabhava. Organs derived from the maternal source in the embryo are organs formed from the Shonita (Artava) of the mother. X chromosome of both the ovum and sperm can be considered as a part of Artava as a female child retains her two X chromosomes from her mother and father's mother (grandmother) and a male child retains his X chromosome from his mother. Mitochondria of the body are exclusively maternal in origin as the mitochondria of the sperm do not enter the ovum at the time of fertilization. Mitochondrial DNA can be considered as the constituents of Artava. Mutations in the genes of X chromosome and mitochondrial DNA leads to abnormalities in Muscles which explains the possibility of Mamsa as a Matrujabhava.

Keywords

Mamsa, Matrujabhava, Artava, Genes, X chromosome, Mitochondrial DNA



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INTRODUCTION

Garbha is formed out of the combination of Matrujabhava, Pitrujabhava, Atmajabhava, Satmyajabhava, Satvajabhava and Rasaja bhava¹. Factors responsible for the growth of garbha in the womb of mother are MatrujadhiGarbhakarabahva, proper regimen of the mother, availability of nourishment and heat through upasneha and upasweda respectively, proper time and natural tendencies².

REVIEW OF LITERATURE

Mamsa is a matrujabhava. It is derived from mother³. Mamsapeshi provide strength and stability to body⁴. Bones act as supports for muscles which are attached to it and do not fall down⁵. Peshis are present in the limbs, Hrudaya and Amashaya also. They cover the bones, small and big joints of the body and make them strong⁶.

Muscular strength reflects the prime function of the muscle-changing chemical energy (in the form of ATP) into mechanical energy to generate force, perform work and produce movements. It stabilizes the body positions and generates heat⁷.

Skeletal muscles are most abundant and are attached to skeleton, Smooth muscle

encircles or surrounds the viscera and Cardiac muscle forms the myocardium of heart⁸.

Chakrapani explains that Organs derived from the maternal source in the embryo are nothing but the organs formed from the Shonita (Artava) of the mother⁹. At the time of conception predominance of Shukra produces male child and that of Artava creates a female child¹⁰.

Both males and females retain one of their mother's X chromosomes, and females retain their second X chromosome from their father. Since the father retains his X chromosome from his mother, a human female has one X chromosome from her paternal grandmother (father's side), and one X chromosome from her mother. Sex determination is done according to the presence of sex chromosome in the gametes. At the time of fertilization If the sperm is X-bearing the zygote will have 44+X+X chromosome and the offspring is a girl. If the sperm is Y-bearing the zygote has 44+X+Y chromosome and the offspring is a boy¹¹.

RELATION OF X CHROMOSOME WITH MUSCLE TISSUE

Duchene muscular dystrophy (dystrophy-degeneration) are inherited muscle



destroying diseases that cause progressive degeneration of skeletal muscle fibres leading to atrophy. The disorder becomes apparent usually between the ages of 3 to 5 years. A protein named dystrophin is present in the sarcolemma of normal muscle. Lack of dystrophin results in leakage of calcium ions into the sarcoplasm. This in turn activates an enzyme phospholipase A that causes muscle fibres to degenerate¹².

Disease is manifested by an awkward gait, inability to walk and difficulty in climbing stairs. Calf muscles show an apparent increase in size due to replacement of muscle fibres by fat and connective tissue called the pseudo hypertrophy. Respiratory failure usually causes death.

DMD gene is located in the short arm of X chromosome Xp21 and in affected boys this gene undergoes micro deletion. In DMD the gene that codes for the protein dystrophin is mutated, so little or no dystrophin is present in the sarcolemma. Mutated gene is present on X chromosome. Dystrophin is located close to the muscle membrane (Sarcolemma) and acts as a link between extracellular lamina and intra cellular Actin¹³.

RELATION OF MUSCLE TISSUE WITH MITOCHONDRIAL DNA

Mitochondrial DNA mutation affects the skeletal muscle and Heart. Since mitochondria are exclusively maternal in origin, disorders of mt DNA affect both males and females transmitted through mothers¹⁴. At the time of fertilization the middle piece which has mitochondria and the tail soon separates from the head of the sperm and degenerate¹⁵. So all mitochondria are exclusively maternal in origin.

DISCUSSION

By comparing the function and location of Mamsa with the functions and location of Muscle, Mamsa can be correlated to Muscle tissue.

X chromosome of both the ovum and sperm can be considered as a part of Artava as a female child retains her two X chromosomes from her mother and father's mother (grandmother) and a male child retains his X chromosome from his mother.

Predominance of Artava at the time of conception leads to female child explains that X chromosome of both ovum and sperm can be considered as a part of Artava.

Mitochondrial DNA can be considered as the constituents of Artava as the mitochondria of the sperm do not enter the ovum at the time of fertilization



Mutations in the DMD gene of X chromosome leads to Duchene muscular dystrophy and mutation of mitochondrial DNA affects the muscle tissue which explains the importance of genes of X chromosome and mitochondrial DNA for healthy Muscle tissue.

CONCLUSION

Muscle tissue provides the muscular strength essential for movements and may be considered as Mamsadhatu.

X chromosomes of both ovum and sperm and mitochondrial DNA can be considered as a part of Artava which are responsible for the formations of organs derived from the mother.

Mamsa is a Matrujabhava because abnormalities in the Muscle are observed in mutations of DMD gene of X chromosome and in mutations of mitochondrial DNA.



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