GENETIC ASPECTS OF SPINAL DYSRAPHISM

by

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Spinal dysraphism is a complex developmental defect of man and animals which occurs when there is a failure of the midline dorsal embryonic structures to fuse. This results in varying degrees of structural and functional abnormalities of the spinal cord, vertebral column, muscles and skin, concomittant with an abnormal posture, gait, and body conformation.--Sixty experimental matings were made using dysraphic and normal dogs to test for genetic control. Three mating combinations were used: dysraphic x dysraphic, dysraphic x normal, and normal x normal in which the "normals" had one or both parents affected. Four hundred offspring from these matings were observed and periodically given neurological examinations from birth to four years of age. The spinal cord and other tissues were examined from experimental dogs of different age groups. Results of the spinal cord histopathology were correlated with results of the neurological examination in an attempt to simplify diagnosis.--Dysraphic puppies were produced from outcrosses to normal, excluding a recessive gene being the major controlling factor. But apparently "normal" dogs from affected parents, when mated to one another, also produced some dysraphic offspring. This suggests reduced penetrance. All three mating combinations yielded some puppies that died at or near birth, some dysraphic and some apparently "normal". Dysraphic by dysraphic matings yielded the highest frequency of neonatal deaths and dysraphic offspring. It is suggested that spinal dysraphism in dogs is controlled by a pleiotrophic codominant gene with variable expressivity and reduced penetrance.

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