CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP150081

Project Title:
Genetic susceptibility to testicular germ cell tumors

Award Mechanism:
Individual Investigator Research Awards for Cancer in Children and Adolescents

Principal Investigator:
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Entity:
Baylor College of Medicine

Lay Summary:

Testicular germ cell tumors (TGCTs) are the most frequent solid tumor diagnosed in boys and young men. TGCTs result from defects in the development of embryonic male germ cells, which normal develop into sperm. TGCTs are treatable by surgery, radiation, and chemotherapy. However, current treatments cause long-term side effects such as mental impairments and infertility. TGCTs may also spread to other organs if not detected early or completely removed. In addition, many TGCTs are resistant to otherwise effective treatment options. Thus, improvements in early diagnosis and treatment remain important, and the social, emotional, and medical costs remain high. The likelihood of an individual developing a TGCT is significantly increased when a relative also has a TGCT. Studies of human TGCTs have begun to identify genes associated with inherited risk. However, these associations only contribute to a small portion of total risk. Additionally, studies to characterize how these genes contribute to TGCT risk are hindered by the limited availability of human tumor samples and the initiation of TGCTs during embryonic life. In this application, we use mice that spontaneously develop TGCTs to model the disease seen in humans and to characterize new inherited traits, or genes, that contribute to the complexity surrounding the genetic component of TGCTs. These studies are possible due to the similarities in TGCT inherited risk factors and disease progression between mice and humans. We propose studies to demonstrate that three key genes participate in a web of complex interactions that disrupt the normal development of male embryonic germ cells in mice. We believe that in germ cells, misregulation or misexpression of these genes, and their inappropriate interactions with other genes, transform the germ cells to become seeds of tumor growth. Additionally, we propose studies to determine whether these genes are potential treatment targets for TGCTs in young boys and adolescents.