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Uterine Fibroids: The elephant in the room meets the immunodeficient mouse in the corner

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Abstract

Uterine fibroids (UF) are benign tumors originating from the smooth muscle of the myometrium and affect more women than any other gynecological disorder. The NIH reports that ~75% of women over the age of 50 develop UF, and ~30% of these women will (for reasons largely unknown) become afflicted with various adverse symptoms that negatively impact their quality of life. Despite this high rate of morbidity, UF research has long been hampered by poor funding and the lack of a reproducible animal model to develop novel pharmacotherapies designed to effectively shrink the benign tumors – collectively, UF remains a true 'elephant in the room'. We recently developed a novel animal model of the disease, in which pieces of human UF and naïve myometrium tissues were transplanted subcutaneously into CB-17 severe combined immune deficient (SCID) mice, which lack functional T cells and B cells, respectively (Keator et al, Fertility and Sterility (2010) 94:S76). Using this novel animal model, this study was designed to better understand the effects of long-term hypoxia on UF growth. UF and naïve myometrium tissue grafts were stored in cold preservation solution and then immediately transplanted subcutaneously in one cohort of mice (controls; Cohort A; n=9), or held in cold preservation solution at 4°C for an additional 5 days and then transplanted into a second cohort of mice (treatment; Cohort B; n=7). After 60 days of growth, tissue grafts were collected and weighed at necropsy. UF grafts were larger than naïve myometrium ($P<0.05$) in both cohorts of mice, and UF tissues held in cold preservation solution for 5 days collected from Cohort B mice tended ($P=0.10$) to be larger compared with the UF tissues collected from the control cohort. These results indicate that hypoxia stimulates UF growth, further suggesting that hypoxia may be a contributing factor that triggers the growth and transformation of asymptomatic UF to symptomatic UF in women afflicted with this common gynecological disorder.

Biography

Christopher S. Keator completed his postdoctoral training in the Division of Reproductive & Developmental Sciences at the Oregon National Primate Research Center (ONPRC), where he conducted translational research studies designed to improve women's health. Projects at ONPRC were aimed at understanding the molecular and physiological changes that occur in the primate uterine blood vessels, during early pregnancy and in those individuals afflicted with endometriosis and uterine fibroids. Dr. Keator is currently the director of the Reproductive System Modules of the Foundations of Medicine basic sciences curriculum at Ross University School of Medicine (RUSM).