2. ADVANCING THE UTILITY OF MODELS OF ORGAN DEVELOPMENT

Gail P Risbridger, Ghanim Almahbobi and John Bertram
Centre for Urology Research and Dept Anatomy, Institute of Reproduction & Development, Monash University, Melbourne, Australia

The prostate gland is an organ of the reproductive system that undergoes branching morphogenesis. Beginning during fetal life and continuing through puberty, there is a complex set of spatial and temporal events leading to mature gland development. In order to understand how abnormal prostate development occurs and to identify genes controlling branching morphogenesis and growth, normal development was previously mapped in several ways. Most commonly this involved the use of ductal spreads of isolated prostates and visualisation of branching using 2D images. Usually the number of main ducts was reported and/or the number of branch tips; occasionally stereological techniques were used. One of the main limitations of this older type of methodology relates to the 3D organisation of the gland, which is not represented in 2D images. We have developed a system to detect and quantify the normal patterns of branching morphogenesis in the prostate using confocal microscopy and computer-based algorithms. Using this system we measure the gland volume, branch length and the number of branches, branch points and branch terminal tips. Analyses of transgenic mice with a prostate phenotype identify the parameters affected by the modified gene and thus identify the mechanism of action of the genes on the branching process. Using this model system we report the differential effects of the aromatase and BMP 4 genes on branching morphogenesis that results in prostatic hypertrophy and hyperplasia.

10.1071/SRB03Ab2