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Rapid Proliferation of Prostatic Epithelial Cells in Spontaneously Hypertensive Rats: A Model of Spontaneous Hypertension and Prostate Hyperplasia

ARIELLA MATITYAHOU, NURIT ROSENZWEIG AND ELIAHU GOLOMB

From the Department of Pathology, Sackler Medical School, Tel-Aviv University, Israel.

Correspondence to: Dr Eliahu Golomb, Department of Pathology, Sackler School of Medicine, Tel-Aviv University, Ramat-Aviv 69978, Israel (e-mail: golombe{at}hotmail.com).

Spontaneously hypertensive rats (SHRs), a commonly used model of genetic hypertension, exhibit features of glandular hyperplasia of the ventral prostate, including the narrowing of acini with epithelial protrusions into the lumen and the piling up of epithelial cells. These rats also have frequent urinary voiding. In order to define the fundamental processes that lead to prostatic hyperplasia in SHRs, we compared the proliferation rate of their prostatic epithelial cells (PECs) in primary culture and in vivo to that of Wistar-Kyoto rats (WKYs), their normotensive controls. In vitro, primary cultures of SHR PECs had a shorter doubling time than those of WKY (3.3 vs 8.0 days) and showed higher levels of bromodeoxyuridine (BrdU) incorporation into DNA. In vivo, the BrdU incorporation seen 48 hours following injection was observed primarily in areas of epithelial piling up, which are seen in SHRs but not in WKYs. We concluded that prostate hyperplasia in SHRs results from a genuine increase in the proliferation rate of PECs and that this rapid proliferation is a fundamental feature of SHR PECs, maintained both in vivo and in vitro. Thus, SHRs can serve as a model for glandular hyperplasia of the prostate, resulting from a genetic tendency for an increased rate of cell proliferation.

Key words: Bromodeoxyuridine, cell culture, Alamar Blue, growth

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