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Epithelial Localization of Green Fluorescent Protein-Positive Cells in Epididymis of the GAD67-GFP Knock-in Mouse

HIROKAZU ABE^{*}, YUCHIO YANAGAWA[†], KIYOTO KANBARA[‡], KENTARO MAEMURA[‡],
HANA HAYASAKI[‡], HARUHITO AZUMA^{*}, KUNIHICO OBATA[§], YOJI KATSUOKA^{*},
MASAMI YABUMOTO^{||} AND MASAHIITO WATANABE[‡]

From the Departments of ^{} Urology and [†] Anatomy, Osaka Medical College, Osaka, Japan; [‡] Department of Genetic and Behavioral Neuroscience, Gunma University Graduate School of Medicine, Maebashi, Japan; CREST and SORST, Japan Science and Technology Corporation, Kawaguchi, Japan; [§] Neuronal Network Mechanisms Research Group, RIKEN Brain Science Institute, Saitama, Japan; and ^{||} Medical Corporation Kinshukai, Osaka, Japan.*

Correspondence to: Dr Masahito Watanabe, Department of Anatomy, Osaka Medical College, Takatsuki, Osaka 569-8686, Japan (an2002{at}art.osaka-med.ac.jp).

γ -Aminobutyric acid (GABA), which is a major inhibitory neurotransmitter in the brain, is also found in many peripheral nonneuronal tissues, including male reproductive organs. However, the distribution of GABAergic cells in various organs is not known. The GAD67-GFP knock-in mouse is a useful model for studying the distribution and morphology of GABAergic neurons in the brain. We examined the male reproductive organs of GAD67-GFP knock-in mice by fluorescence microscopy and found cells with strong green fluorescent protein (GFP) signal exclusively in the epithelium of the initial segment and proximal caput of the epididymis. The characteristic cell morphology suggested that these were narrow cells. These GFP-positive narrow cells also expressed GAD67 and GABA. Reverse transcription polymerase chain reaction (RT-PCR) analysis showed that the predominant glutamic acid decarboxylase (GAD) isoform expressed in the epididymis is GAD67. RT-PCR analysis also revealed that mRNAs encoding the GABA_A and GABA_B receptor subunits necessary for the assembly of functional receptors are expressed in the epididymis. GABA_A receptor subunit mRNAs detected in the proximal epididymis included α 2, β 1, γ 1, and γ 3, and both the R1 and R2 subunit mRNAs of GABA_B receptors were detected. Immunohistochemical analysis of GABA_A receptor subunit proteins revealed that α 2, β 1, and γ subunits expressed in spermatozoa, whereas we did not detect these GABA_A receptor subunits in epithelial cells. GABA_B receptors were produced by narrow cells and spermatozoa of GAD67-GFP knock-in and wild-type Jcl:ICR mice. Our data suggest that the GABA system might have important functional roles in narrow cells and on spermatozoa in the lumen.

Key words: Narrow cell, GABA, immunohistochemistry, GABA_A receptor, GABA_B receptor

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