Upregulation of the SERCA-type Ca2+ pump activity in response to endoplasmic reticulum stress in PC12 cells

ABSTRACT

The ER stress prompt prompts the discovery of the first functional evidence for the increase in SERCA pumping capacity. The findings indicate that there is a connection between the regulation of SERCA pump isoforms and the ER stress response, as three distinct and unrelated processes contribute to the upregulation of Ca2+ transport into the ERG.

INTRODUCTION

A severe B cell transition block is observed in X-linked agammaglobulinemia (reviewed in reference) caused by mutations in the Btk kinase, leading to a human disease with this condition. The Tec family of non-receptor protein tyrosine kinases (PTKs), which include Bmx, Itk, tec and Txk includes Btk. However, the mutated Bzk and the knockout mouse share similar phenotypes, although the latter two are not as severe. Besides a domain that is either COOH-terminal PTK or has an NH2-terminAL pleckstrin homology (PH) and Tec homologies, Btk also has overlapping Src-homology 3 (SH3) and SH2 domains. Although it was initially identified in B cells, it is now known to be expressed in most leukocytes except for T cells and the NK cells. The activation of Btk during BCR cross-linking is thought to be a two-step process that involves PI 3-kinase and the Src family PTK Lyn. PK3 generates phosphatidylinositol 3,4,5-trisphosphate (PIP3), which Buckker membrane targeting can be achieved by the PH domain of BrtK. Btk is activated within the activation loop of the kinase domain by Lyn, which autophosphorylates the SH3 domain and complete activtion of Btons. Inositol phosphatases (SHIP) downregulate Bpt0 by dephosphoryating PIP3. Btk is a crucial enzyme in the biological regulation of B cells, as demonstrated by biochemical studies and clinical trials. Typically, these signaling events are not completely abrogated, and kinetic analyses have shown that the prolonged phases are particularly impaired in the absence of Btk. Conversely, cessation of these pathways is completely inhibited in non-coding of the Syk/ZAP-70 family tyrosine kinase Sykla. Btk and Syk are believed to cooperate in PLC2-dependent BCR signaling, as evidenced by the data, and Btons serve as a signal duration modulator (refer to references). However, it remains unclear whether Bckck can accurately replicate certain downstream signals or remain dependent on PLTk. Recently, there have been suggestions that Btk has supplementary functions, including PI 3-kinase activation, cytoskeletal reorganization and DNA transcription. To overcome these limitations, we have created a modified form of Bctky by combining the full-length Bfk protein with the hormone-binding domain of the estrogen receptor (Btker:ER). Our findings indicate that Btk:ER activation alone can trigger multiple downstream signaling pathways in B cells, including calcium mobilization, ERK and JNK MAPK, and apoptosis. Furthermore, our analysis of Blc function in PLC2-deficient cells confirms that PLD2 is essential for Bfk's ability to transmit these signals.

CONCLUSION

The 1 subunit has the ability to selectively modulate the pore function of the DNasehirgic Receptor Plasticity Factor (DHPR) without any modification of charge movements or voltage dependence of Ca2+ transients, which is not the case for other DHRP subdomains. The charge movement protocol probably did not account for gating currents that open

the Ca2+ channel, which are relatively small and only resolve depolarizations lasting >200 ms compared to the 25 mms used here (Fig. 4). The potential alteration in the voltage-dependent behavior of charges recruited through long depolarizations would be consistent with the Ca2+ current inactivation and necessitates a resolution that remains unclear in 1 null myotubes. However, the protocol measures the immobilization-resistant charge movements that are typically necessary for skeletal-type EC coupling. According to a recent report, the activation of SR Ca2+ release is not likely to be dependent on the 1 subunit. However, changes in voltage dependence below the resolution limit and effects on charge movement and Ca 2+release inactivation cannot be completely excluded. The 1 knockout mice offer a unique opportunity to learn about the protein's function in myotubes in great detail.