Calcium mediates dorsoventral patterning of mesoderm in Xenopus

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Calcium signals participate in the differentiation of electrically excitable and nonexcitable cells; one example of this differentiation is the acquisition of mature neuronal phenotypes [1]. For example, transient elevations of the intracellular calcium concentration have been recorded in the ectoderm of early embryos, and this elevation has been proposed to participate in neural induction [2-5]. Here, we present molecular evidence indicating that voltage-sensitive calcium channels (VSCC) are involved in early developmental processes leading to the establishment of the dorsoventral (D-V) patterning of a vertebrate embryo. We report that 1S VSCC are expressed selectively in the dorsal marginal zone at the early gastrula stage. The expression of the VSCC correlates with elevated intracellular calcium levels, as evaluated by the fluorescence of the intracellular calcium indicator Fluo-3. Misexpression of VSCC leads to a strong dorsalization of the ventral marginal zone and induction of t