A Cl^- channel, CLC2b, is involved in Cl^- uptake mechanism in zebrafish

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The CLC gene family encodes Cl^- channels or Cl^-/H^+ exchangers. In mammals, CLC family is involved in ion reabsorption, and is expressed in basolateral membranes of the cells of Henle's loop, distal convoluted tubule (DCT) and collecting duct. In zebrafish skin/gills, a group of ionocytes, Na^+ Cl^- cotransporter (*zslc12a10.2*)-rich (NCC) cells, was recently identified to be involved in Cl^- uptake as the mammalian DCT cells. The aim of the present study is to test the hypothesis if one or more member of CLC is the basolateral transporter in the Cl^- uptake mechanism in zebrafish NCC cells. Eleven members of CLC gene family were cloned, and only one of them, *zclc2b*, was found to be predominately expressed in adult gills and embryonic skin. Double *in situ* hybridization/immunocytochemistry demonstrated the specific colocalzation of *zclc2b* mRNA in NCC cells. Gill mRNA expression of *zclc2b* was induced by a low-Cl environment, being correspondent with that of *zslc12a10.2*. Expression of *zclc2b* mRNA in the *zslc12a10.2* morphants injected with specific morpholinos was up-regulated, suggesting a compensatory response in NCC cells. These results for the first time provide *in vivo* molecular physiological evidence for a possible role of CLC2b in the Cl^- uptake mechanism in zebrafish skin/gills.