P21. Connexin-36 protects against suddent infant death syndrome

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The sudden infant death syndrome (SIDS) is the main cause of postneonatal infant death; however the etiology of SIDS remains ill defined. The hypothesis that SIDS, or a subset of SIDS, is due to an abnormal brainstem mechanism is one of the current leading hypotheses on SIDS etiology. The brainstem is essential for cardiac and respiratory function, controlling autonomic and homeostatic responses including breathing, central chemosensitivity, heartbeat and blood pressure, all mechanisms that are thought to be involved in SIDS. Connexin-36 (Cx36), the principal component of neuron-to-neuron channels that form the electrical synapses, is present in the specific neural populations of brainstem region involved in the CO_2 chemoreception and respiratory control, and its expression is unregulated during this critical period of life. Accordingly, we postulate that Cx36 would be a key element in the pathogenesis of SIDS. To address this issue we have studied how the genetic suppression of Cx36 expression affects to the respiratory pacemaker, central chemoreflexes, cardiorespiratory coupling, and risk for SIDS. Mice lacking Cx36 at postnatal day 14 showed in comparison with control wild-type greater variability in the respiratory rhythmicity, abnormally enhanced ventilatory responses to hypoxia and hypercapnia, more cardiorespiratory phase synchronization and less respiratory sinus arrhythmia. A combination of low O_2 and high CO_2 content in inspired air was used as exogenous stressor of SIDS; under these conditions all wild-type mice survived while the 40% of Cx36-knockout animals succumbed by respiratory failure.

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