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| **Serotonin neuron abnormalities in the medullary serotonergic network of SIDS infants in a separate independent cohort from South Australia** |
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| **Introduction** Serotonin (5HT) neurons in the medulla project extensively to key autonomic and respiratory nuclei in the brainstem and spinal cord, regulating critical homeostatic functions. Previous abnormalities in the medullary 5HT network in SIDS have been reported, including abnormal 5-HT neuron firing, synthesis, release, and clearance. The current study aimed to further investigate potential cellular defects in the medullary 5HT network in SIDS, by replicating methods of previously published research (Paterson et al 2006) in a separate independent infant cohort from the different geographic location (South Australia). Formalin-fixed paraffin-embedded medullae from infants dying from SIDS (41) and control cases (39) dying from causes of death other than SIDS, were obtained from Forensic Science South Australia. The cohort comprised of 80 cases from the period 1999-2006. Analysis of serotonin cell number, density and morphology was compared between SIDS and control cases. **Objectives:** To quantitatively investigate potential cellular defects associated with altered 5HT network function in the medulla in SIDS infants in a separate independent cohort from South Australia, using previously published methods.  **Material and Methods** Determination of 5HT neuron number, density and morphology in SIDS versus controls using immunohistochemical staining for tryptophan hydroxylase (TPH2) in formalin fixed human infant brainstem tissue sections. Quantitative 5HT neuron cell count analysis was then performed using the Neurolucida computer based method.  **Results** Significant differences in total 5HT neuron number, expression by medullary region and neuron morphology were evident across all control subgroups analyzed against the SIDS cohort. SIDS cases had significantly higher proportions of 5HT neurons, principally in the rostral medulla, including a significantly higher proportion of immature 5HT neurons compared to controls.  **Conclusions** This study shows similarities to previously published work, with significant abnormalities in 5HT neuron number and morphology in SIDS cases from a separate independent cohort. The results therefore strengthen and confirm the theory of medullary 5HT dysfunction in a subset of SIDS cases. **Funding source:** River’s Gift International SIDS Fellowship |
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