Sudden death in epilepsy (SUDEP)

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Mark Stewart's research focuses on the autonomic consequences of seizure activity, where he and colleagues have identified mechanisms for autonomic and respiratory derangements and death in epilepsy, including the identification of obstructive apnea due to seizure-induced laryngospasm as a critical contributor to sudden death in epilepsy (SUDEP). A review of this mechanism published in Frontiers in Neurology in 2020 was an Editor's Top Pick and is already in the top 5% of all Frontiers downloads. Proposed first aid guidelines were published in 2021 in Frontiers in Neurology and this paper is already in the top 8% of all Frontiers downloads. Stewart and collaborators have used rat and mouse models as primary tools to explore the pathophysiology of SUDEP and to develop several novel technologies (3 patents awarded, 2 pending, 1 licensed). Some device work has involved large animal models (sheep, pigs). Past work on hippocampal theta rhythm with Steven Fox involved rat and non-human primate models. Past work on basic and epileptogenic properties of hippocampal formation regions with Robert Wong involved guinea pig models.

Relevant references:

1: Lucchesi M, Silverman JB, Sundaram K, Kollmar R, Stewart M. Proposed Mechanism-Based Risk Stratification and Algorithm to Prevent Sudden Death in Epilepsy. Front Neurol. 2021 Jan 25;11:618859. doi: 10.3389/fneur.2020.618859. PMID: 33569036; PMCID: PMC7868441.

2: Stewart M, Silverman JB, Sundaram K, Kollmar R. Causes and Effects Contributing to Sudden Death in Epilepsy and the Rationale for Prevention and Intervention. Front Neurol. 2020 Jul 31;11:765. doi: 10.3389/fneur.2020.00765. PMID: 32849221; PMCID: PMC7411179.