proportional to the degree of mitochondrial heteroplasmy. Both individuals showed common denominator of variably expressed abnormities of the neuronal migration resulting in cortical mild microdysgenesis and wide-spread neuronal heterotopia in the white matter.

Conflicts of Interest:

None.

## Abstract A15

### The Role of RVLM and PACAP in Sympathetic Response and Breathing Stability

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doi:10.1017/cjn.2015.381

Intermittent hypoxic (IHx) episodes are typically a consequence of sleep apnea in adults and immature respiratory control in preterm infants. Chronic IHx contributes to immediate and long term co-morbidities including long-term cardiorespiratory instability. Despite intensive investigation, molecular mechanisms linking IHx to cardiorespiratory instability remain poorly understood.

We report that PACAP, a highly conserved excitatory neuropeptide which can function as an "*emergency response*" co-transmitter in the sympathoadrenal axis, plays a significant role in activating the sympathetic responses to hypoxia and stabilizing respiration. Further, we show that the effect of PACAP on the sympathetic response to intermittent hypoxia in adult rats is mainly regulated at the rostro-ventral-lateral medulla (RVLM).

To show the role of RVLM and PACAP in sympathetic response and breathing stability we used an *in vivo* anesthetized artificially ventilated rat preparation, as well as a neonatal rat *in situ* working heart-brainstem preparation and whole-body plethysmography.

Our data showed that inhibition of PACAP at the RVLM is able to dampen facilitated sympathetic activity caused by IHx. PACAP treated *in-situ* neonatal rat preparations with carotid bodies denervated showed less short-term variability in phrenic nerve output frequency when compared with vehicle treated preparations. All PACAP-null mice (n = 5) died when exposed to acute IHx while all wild-type mice survived. Both frequency and minute ventilation were significantly decreased in PACAP-null mice during the last hypoxia. In another set of experiments we showed that exogenous PACAP replacement in PACAP-null mice can increase the survival rate by up to 80%.

Our data suggests a regulatory role for PACAP in the development of the sympathetic response and cardiorespiratory stability after exposure to IHx in adult and neonatal mice. The effect of PACAP on sympathetic plasticity is shown to be mediated through its action in the RVLM. To our knowledge and of great importance, PACAP is the first neuropeptide that is shown to be necessary to survive IHx.

Conflicts of Interest:

None.

## Abstract A16

### Widening histologic spectrum of myopathy with plasma cell dyscrasia

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doi:10.1017/cjn.2015.382

*Background:* Myopathy associated with plasma cell dyscrasia is rare. Reported cases include paraneoplastic and paraproteinaemic disease (poly/dermatomyositis-like; light chain deposition disease; amyloidosis), or focal mass lesions. Histologic data are scarce.

*Case:* A 74-year-old male presented with five months of progressive, symmetric shoulder and quadriceps weakness and wasting. Electrophysiologic studies suggested myositis, ESR was greater than 120 mm/hr, and the CK was around 1000 IU/L. Deltoid biopsy was initially reported as inflammatory myopathy with dystrophic features. Upon review, sheets of CD138-positive plasma cells filled with abundant Russell bodies were identified, mimicking round atrophic muscle fibres. Muscle fascicles showed dense focal lymphoplasmacytic inflammation, muscle fibre necrosis, and fibroadipose replacement. Plasma cells were kappa light chain restricted. A diagnosis of plasma cell dyscrasia was made.

*Conclusion:* We report a case of symmetric proximal muscle weakness and wasting with a histologic diagnosis of light chain restricted plasma cell infiltration and lymphoplasmacytic myositis. Symmetry of muscle involvement suggests a combination of paraproteinaemic, paraneoplastic, and diffusely infiltrative processes. This case may add a new histologic variant to the spectrum of myopathies associated with plasma cell dyscrasia.

Conflicts of Interest:

None.

## Abstract A17

### Dorsal root ganglia in Friedreich ataxia: The critical role of satellite cells

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doi:10.1017/cjn.2015.383

Friedreich ataxia (FA) causes a complex clinical and neuropathological phenotype. Dorsal root ganglia (DRG) are a primary target of the disease. Traditional interpretation of the DRG lesion includes atrophy of large neurons, proliferation of satellite cells,