NEUROLOGIST HANDOUT
Issues Specific to Myalgic Encephalomyelitis (per the ICC*)

Neurocognitive, sleep, autonomic and sensory disturbances, pain, headaches, and paresthesias are prominent neurological signs and symptoms. Cognitive impairments including slow processing of information, poor attention, word finding, and working memory are some of the most functionally disabling symptoms. 1, 2

Structural and functional abnormalities within the brain and spinal cord are consistent with pathological dysfunction of the regulatory centers and communication networks of the brain, CNS and ANS, and are essential for effective ongoing self-organization. 3

Reduced brainstem gray matter volume is consistent with insult to the midbrain at fatigue onset. Feedback control loops may suppress cerebral motor and cognitive activity, disrupt CNS homeostasis, and reset elements of the ANS. Brain stem injury and loss of homeostasis. Decreased gray matter volume in midbrain & pulse pressure suggest impaired cerebrovascular auto-regulation. Decreased white midbrain matter volume decreased with fatigue duration. 4, 29

Greater source activity and more parts of the brain are utilized in cognitive processing, which supports patients' perception of greater effort. 5, 6, 28

Reduced duration of uninterrupted sleep may explain reported unrefreshed sleep, pain and overwhelming fatigue. Prolonged sleep onset latency. Increased alpha intrusion into delta sleep 7

Decreased absolute cortical blood flow and further reduction in cerebral blood flow after exercise. Greater involvement of the brain correlates with greater severity 8, 9

Decreased hypoperfusion in brainstem distinguishes ME from depression. 10

Decreased cognitive functioning: prolonged reaction time 11

Increased plaque or hyperintensities in the white matter & tracts is consistent with demyelination or inflammation & increase risk of cerebrovascular events 12, 13

Reduced regional gray and white matter volumes are consistent with impaired memory and visual processing. 14, 15, 16

Decreased metabolism of glucose in the brain 17

Metabolism in brain stem differentiates ME from depression 8, 10

Greater effort is required - elevated source current & more regions of the brain are utilized in cognitive activity & fatiguing tasks: poor processing of auditory & spatial information, poor working memory. 1, 5, 6

Slower performance in visual imagery & motor tasks - ventral anterior cingulate cortex was active when controls made an error but not in patients. 15

Reduced blood flow in temporal lobes may contribute to memory and cognitive impairment & fatigue 18, 19

Elevated sensory signaling perceived by the brain as pain and fatigue. Musculoskeletal – (surface EEG scalp) CNS signals are altered when controlling voluntary muscle activities, especially when they are fatiguing. Poor and slower motor performance. 20, 21

Abnormal spatial and temporal symmetry of gait. 22

Cerebral spinal fluid - (spinal tap) increased opening pressure on lumbar puncture. Proteomes distinguish ME from post-treatment Lyme disease and controls. Spinal fluid increased lymphocytes and protein. 23, 24

IL-10 increased with granulocyte-macrophage (GM), colony-stimulating factor (CSF) suppression 24

Elevated lactate is consistent with reduced cortical blood flow, mitochondrial dysfunction & oxidative stress. Lateral ventricular: 297% vs. anxiety disorder & 348% vs. controls. 25

In CFS T1wSE was elevated in sensorimotor WM and decreased in the brainstem. 26

Neuroinflammation in Patients with CFS/ME: An ^{11}C-(R)-PK11195 PET Study. 27

Neuroinflammation in the dorsal root ganglia, (modulators of peripheral sensory information traveling to the brain) - Chaudhuri A. Abstract presentation at the Royal Society of Medicine Meeting 2009

Note: Many science documents refer to this patient population having CFS. While CFS is a broad vague term, studies listed here are chosen as they apply most closely to those who have ME as per the ICC.

More science information can be found at on the resources page at www.MEadvocacy.org

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Resource citations

*__Myalgic Encephalomyelitis International Consensus Primer for Medical Practitioners__ (Page 5)
http://sacfs.asn.au/download/me_international_consensus_primer_for_medical_practitioners.pdf

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