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## The 10,000 fold effect of retrograde neurotransmission-A new concept for cerebral palsy revival: Use of nitric oxide donors (intrathecal sodium nitroprusside and oral tadalafil)

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**Introduction:** Nitric-oxide-donors (NODs) [intrathecal sodium nitroprusside (IT SNP)] and oral tadalafil is studied in cerebral palsy (CP). This work proposes three mechanisms for cerebral palsy cases, which are interrelated for swift physiological recovery. A) Retrograde neurotransmission: Normal excitatory impulse - at the synaptic level, glutamate activates NMDA receptors, with nitric oxide synthase (NOS) on the postsynaptic membrane, for further propagation by the calcium-calmodulin complex. Nitric oxide (NO, produced by NOS) travels backward across the chemical synapse and binds the NO receptor at presynaptic neuron, regulating anterograde neurotransmission (ANT) via retrograde neurotransmission (RNT). Heme is the ligand-binding site of the NO receptor. Heme exhibits >10,000-fold higher affinity for NO than for oxygen (10,000-fold effect) and; pathological conditions -normal synaptic activity, including both ANT and RNT, is absent. NO donors release NO from NOS at the postsynaptic region generates an impulse, same as under normal conditions. B) Vasospasm: Perforators show vasospastic activity. NO vasodilates it via NO-cAMP pathway. C) Long-term-potential (Ltp): The NO-cGMP-pathway plays a role in LTP at many synapses throughout the CNS and at the neuromuscular junction for memory/learning.

**Materials & Method:** 60 random CP - 30 control without NOD or with 5% dextrose superfusion, and 30 patients (irrespective of etiology) comprised the NOD group in which ITSNP and oral tadalafil 0.2 mg per kg/bo/wt per alternate days for three months was given. The mean age for superfusion was 3.75 years. Pre- and post-NOD status was monitored by GMFM-66 with videography and MRI studies.

**Results:** The mean increase in GMFM-66 at post seven days was 37.29% and three months 37.15% in the NOD group, than control-group increase of 0% at seven days or three months.

**Conclusion:** NOD (ITSNP boosts up the recovery and oral tadalafil maintains the recovery) acts swiftly in the treatment of CP.

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