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# Mechano-Transduction Due to *Varmam* Point Manipulation and *Varmam Thadaval* (Massage) Cause Mitochondrial Biogenesis in Metabolic Syndrome

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Glucose and lipid metabolism are largely dependent on Mitochondria to generate energy (ATP) in cells. Excess cellular oxidative stress and oxidative damage to mitochondrial components, resulting in mitochondrial dysfunction (MD) which may be diminished mitochondrial content or mitochondrial activity. Mitochondrial dysfunction impedes insulin metabolic signalling and glucose metabolism results in insulin resistance and lipid accumulation in skeletal muscle and liver ultimately leading to Metabolic syndrome. *Varmam* point manipulation and *varmam* massage are mechanical stimuli given over the skin to make somatosensory mechanoreceptors to respond. These receptors include Meissner's corpuscles, Pacinian corpuscles, Merkel's disks and Ruffini corpuscles. They respond to specific touch related stimuli like pressure and lower frequency vibrations, transient pressure and higher frequency vibrations, Light pressure, stretch respectively. These receptors convert the mechanical stimulation of the skin to electrical signals or chemical signals to produce adaptations within the cell, a process called mechano-transduction. In this mechano-transduction Peroxisome proliferator activated receptor-gamma coactivator (PGC-1 alpha), a key regulator of energy metabolism will be increased. Such increased PGC-1 alpha stimulates mitochondrial biogenesis. Mitochondrial biogenesis has been shown to correct insulin metabolic signalling and other metabolic abnormalities in Metabolic syndrome.

**Key Words**: *Varmam* point, *Varmam Thadaval,* Metabolic syndrome, Mechano-receptors, Mitochondrial biogenesis