P025 Ca^{2+} oscillations stimulate ATP increases in mouse eggs.

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At fertilization in mouse eggs the sperm stimulates a long lasting series of Ca^{2+} oscillations. These Ca^{2+} oscillations have been shown to stimulate mitochondrial metabolism as measured by FAD/NADH autofluorescence. To study the consequences of this stimulation upon egg metabolism we have monitored intracellular Ca^{2+} and ATP in mouse eggs using a Ca^{2+} sensitive fluorescent dye and luminescence from firely luciferase. Luminescence was monitored with a photon counting camera (ICCD, Photek) and intermittent fluorescence excitation of Oregan green BAPTA dextran was used to monitor Ca^{2+} in the same cells with the same camera. We found that ATP increases as soon at Ca^{2+} oscillations are initiated by the sperm. In most eggs the increases in ATP at fertilization showed a second phase of ATP increase that started about 1 hour after the start of Ca^{2+} oscillations. The initial ATP increase was not inhibited by nocodazole which blocks meiosis resumption and cell cycle initiation in eggs. Ca^{2+} oscillations triggered by carbachol, or by injection of phospholipase Czeta, also caused an ATP increase, but a large monotonic Ca^{2+} rise triggered by ionomycin lead to a transient decrease in ATP. Our data suggest that Ca^{2+} release in eggs increases ATP levels when it is initiated by $InsP_3$ production.