TU02-01
ASCORBIC ACID PARTICIPATES IN A GENERAL MECHANISM FOR CONCERTED GLUCOSE TRANSPORT INHIBITION AND LACTATE TRANSPORT STIMULATION
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Here, we present a novel function for ascorbic acid. Ascorbic acid is an important water-soluble anti-oxidant and cofactor in various enzyme systems. We have previously demonstrated that an increase in neuronal intracellular ascorbic acid is able to inhibit glucose transport in cortical and hippocampal neurons. Because of the presence of sodium-dependent vitamin C transporters, ascorbic acid is highly concentrated in brain, testis, lung and adrenal glands. We explored how ascorbic acid affects glucose and lactate uptake in neuronal and non-neuronal cells. First, the expression of glucose and ascorbic acid transporters in non-neuronal cells was studied. Like neurons, HEK293 cells expressed GLUT1, GLUT3 and SVCT2. We observed that only intracellular ascorbic acid, but not extracellular, inhibits 2-deoxyglucose transport in HEK293 cells. As monocarboxylates such as pyruvate and lactate are important metabolic sources, we analyzed the ascorbic acid effect on lactate uptake in cultured neurons and HEK293 cells. Intracellular ascorbic acid was able to stimulate lactate transport in both cell types. Our data show that ascorbic acid inhibits glucose transport and stimulates lactate transport in neuronal and non-neuronal cells. Thus, according to astrocyte neuron lactate shuttle hypothesis and our results, ascorbic acid could work as a metabolic switch, modulating neuronal metabolism between rest and activation periods. FONDECYT1060135, 11070065.

TU02-02
GENETIC REGULATION OF THE MICE MALE ULTRASONIC VOCALIZATION
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Human languages are communication methods by vocalization and characterized by highly patterned and structured. There was only few animal models for language such as birds song, and the absent sexual behaviour and USV patterns in mice strains genetically close. Recently, it was shown that male mice ultrasonic vocalizations (USV) are not mere calls but songs with highly patterned and structured. As the male mice ultrasonic vocalizations (USV) are not mere calls but songs with highly patterned and structured, it has been experimentally determined. A conformational four-site exchange model accounting for trans-acceleration and asymmetry of the carrier was included in a recently developed multi-compartmental model of Glc transport. Based on this model, we demonstrated that G brain as function of plasma Glc can be described by a single, analytical equation describing three kinetic compartments: blood, endothelial cells and brain. Transport was described by four parameters: apparent half saturation constant K s, apparent maximum rate constant T max, the iso-inhibition constant K m, and Glc consumption rate CMR glc. Previous published data, where G brain was quantified as a function of plasma Glc by biochemical or NMR spectroscopy, were used to determine the aforementioned kinetic parameters. Glc transport was characterized by K s ranging from 1.5 to 3.5 mM, T max/CMR glc from 4.6 to 5.6, and K m from 51 to 149 mM. It was noteworthy that K s was on the order of a few mM, as previously determined from the reversible model. This model of Glc uptake into the brain includes both eflux and transport inhibition by G brain, predicting that G brain eventually approaches a maximum when it is higher than K s. However, as K s largely exceeds G brain, iso-inhibition is unlikely to be of substantial importance when plasma Glc is below 25 mM. As a consequence, the reversible model can account for most experimental observations under physiological conditions.