

# Abstract

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## Metabolic and functional effects of glutamate intake in patients with chronic obstructive pulmonary disease (COPD).

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**BACKGROUND & AIMS:** Patients with chronic obstructive pulmonary disease (COPD) often suffer from skeletal muscle weakness due to muscle wasting and altered muscle metabolism. Decreased muscle glutamate concentration in COPD is consistently reported and is associated with decreased muscle glutathione concentration and early lactic acidosis. We hypothesized that an increased availability of glutamate via glutamate ingestion increases muscle glutamate concentration leading to acute improvements in skeletal muscle energy metabolism and function.

**METHODS:** Two experiments were conducted. In experiment 1, in two groups of 6 male COPD patients (FEV(1): 44.8+/-3.4%pred) and 6 healthy controls, blood samples and muscle biopsies were taken at 0 and 80 min after repeated glutamate (30 mg/kg BW) or control ingestion (1.25 ml/kg BW), and after 20 min cycling at 50% peak workload. In experiment 2, in 10 COPD patients (FEV(1): 36.1+/-2.5%pred), the effect of the two drinks was tested on cycle endurance time and contractile quadriceps fatigue measured by magnetic stimulation before and after cycling at 75% peak workload.

**RESULTS:** Glutamate ingestion increased plasma ( $p<0.01$ ) but not muscle glutamate concentration. Muscle total and reduced glutathione and plasma lactate concentration were not affected by glutamate ingestion. Glutamate ingestion did not influence contractile muscle fatigue and endurance time.

**CONCLUSION:** Continuous oral glutamate ingestion for 80 min did not lead to an acute effect on skeletal muscle substrate metabolism and muscle performance in COPD patients and in age-matched healthy controls.

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