Mechanism of Action of the Stimulatory Effect of Kaempferitrin on 14C-Glucose Uptake

Cazarolli, L.H.1; Kappel, V.D.2; Pereira, D. F.2; Folador, P.2; Figueiredo, M.S.R.B.2; Pizzolatti, M. G.3; Silva, F. R. M. B.2

1 Universidade Federal da Fronteira Sul, Campus Laranjeiras do Sul, PR; 2 Dep de Bioquímica, UFSC, SC; 3 Dep. de Química, UFSC, SC, Brasil

Introduction: Flavonoids are naturally occurring phenolic compounds with a broad range of biological activities. Kaempferitrin is one of the several compounds that have been reported to have insulin-like properties in terms of glucose lowering. Objectives: The aim of this study was to investigate the mechanism of action of the stimulatory effect of kaempferitrin on 14C-glucose uptake. Methods: For the [U-14C]-2-deoxi-D-glucose ([14C] DG) uptake experiments, muscles from normal rats (Protocol CEUA/PP007) were pre-incubated (30 min) with KRb, kaempferitrin (0.01 and 1 microM), insulin (10.0 nM) or inhibitors: 100 nM wortmannin, 40 microM RO318220, 50 microM PD98059, 0.35 mM cycloheximide, 100 mM HNMPA(AM)3, 10 microM SB239063 or 1 microM colchicine. After, muscles were incubated (60 min) with fresh KRb, kaempferitrin with/without one of inhibitors plus [14C] DG (0.1 microCi/ml) at 37 °C, pH 7.4 and gassed with O2:CO2 (95%:5%). After incubation, the samples were homogenized in 0.5 N NaOH and boiled for 10 min; 25 µL aliquots of tissue and external medium were used for the radioactivity measurements. The results were expressed as the tissue/medium (T/M) ratio: cpm/mL tissue fluid per cpm/mL incubation medium. Results and conclusions: The stimulatory effect of kaempferitrin was significant at 1 and 0.01 µM. Also, insulin stimulated muscle 14C-glucose uptake. The stimulatory effect of kaempferitrin on glucose uptake was completely inhibited by wortmannin, RO318220, PD98059, SB239063, HNMPA(AM)3, colchicine and cycloheximide pretreatments. The presence of specific insulin signaling inhibitors showed that kaempferitrin triggers different metabolic and nuclear pathways in skeletal muscle, reinforcing proposals that skeletal muscle represents a primary site at which kaempferitrin exerts its effect promoting glucose homeostasis.

Word Keys: glucose uptake, kaempferitrin, flavonoids, mechanism of action.
Supported by: CNPq and CAPES