Endofacial competitive inhibition of the glucose transporter 1 activity by gossypol

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Gossypol is a natural disesquiterpene that blocks the activity of the mammalian facilitative hexose transporter GLUT1. In human HL-60 cells, which express GLUT1, Chinese hamster ovary cells overexpressing GLUT1, and human erythrocytes, gossypol inhibited hexose transport in a concentration-dependent fashion, indicating that blocking of GLUT1 activity is independent of cellular context. With the exception of red blood cells, the inhibition of cellular transport was instantaneous. Gossypol effect was specific for the GLUT1 transporter since it did not alter the uptake of nicotinamide by human erythrocytes. Gossypol affects the glucose-displaceable binding of cytochalasin B to GLUT1 in human erythrocyte ghost in a mixed noncompetitive way, with a K i value of 20 ?M. Likewise, GLUT1 fluorescence was quenched ?80% by gossypol, while Stern-Volmer plots for quenching by iodide displayed increased slopes by gossypol addition. These effects on protein fluorescence were saturable and unaffected