Glutathione transferase (GST) enzymes are traditionally found in the cytoplasm of cells and function to catalyse detoxification reactions. It was recently reported that a member of the GST superfamily can be internalized from the medium by mammalian cells in culture, through an energy-driven process. We have tested the cell transduction capacity of several different classes of GST, along with proteins possessing a GST-fold structure but no enzyme activity. All proteins were found to be internalized by mouse fibroblast cells, suggesting that the GST-fold motif of these molecules drives cellular uptake. To further investigate the mechanism behind cell entry, a variety of endocytosis inhibitors were applied to cells and their effect on GST transduction assessed by flow cytometry. Confocal microscopy was also employed to visualise the intracellular localisation of GST fluorescence and its proximity to a range of vesicular and organelle markers. We are currently exploring the possibility of using recombinant human GSTs as a tool for delivering biological cargo into cells, where the non-immunogenic nature of these proteins will be beneficial to the current field of therapeutic delivery systems.