Selection of resistant soybean (Glycine max L. cv. SJ 4) cell line to glufosinate was attempted using callus and cell suspension cultures derived from hypocotyls of young seedlings. The cells were cultured on MB medium (MS salt + B5 vitamins) supplemented with 10 mg l⁻¹ NAA and 0.3% sucrose, pH 5.7. A soybean cell line resistant to 10⁻⁶ M glufosinate was obtained after 350 days of selection, using stepwise selection with increasing concentration of glufosinate from 10⁻⁸ to 10⁻⁶ M. It was referred as 10⁻⁶ M glufosinate-resistant soybean cell line. Dose-response experiments at the cell level revealed that the resistance index of the resistant cell was 50-fold higher than that of the normal cell. The biochemical study showed that activity of glutamine synthetase (GS) in the resistant cells was 2.2-fold higher than the normal cells at 10 days after 10⁻⁶ M glufosinate treatment. In addition, the molecular basis of resistance to GS gene was investigated by DNA sequencing and northern blot analysis. The partial GS gene from resistant and normal cells was cloned and sequenced. The sequences were deposited in GenBank database with accession number AY919612 and AY920930 for GS gene of resistant and normal cells, respectively. Comparison of the nucleotide sequences identified nine point differences in GS gene between the resistant and normal cells leading to 8 amino acid substitutions in the deduced polypeptide sequence. From northern blot analysis, the accumulation of GS-mRNA in the resistant cells was not different from the one in both non-treated and treated normal cells. The results indicated that the resistance to glufosinate in soybean cell line was due to an alteration of the GS activity, leading to less sensitivity to herbicide, and this being responsible for the resistance to glufosinate.