

**Abstract:**

Mammalian cells have become the dominant system for recombinant expression of pharmaceutical proteins. This system is becoming suitable also for structural biology, with the advances in methodology of transient transfection of mammalian cells. This work dealt with optimization of recombinant expression in HEK293T and HEK293-6E cell lines in various media using easily quantifiable markers - secreted alkaline phosphatase (SEAP) and green fluorescent protein (GFP). Emphasis was placed on optimizing key factors behind the creation of transfection complex - the ratio of DNA to polyethyleneimine and the amount of DNA used. The positive influence of histone deacetylases inhibitor valproic acid and also of casein hydrolysate Tryptone N1 was also studied. (The thesis is written in Czech.)