Glutaminyl cyclase (QC) is an enzyme known to catalyze the cyclization of N-terminal glutaminyl residues into pyroglutamate (pE). QC itself and many of its substrates such as neuropeptides and peptide hormones including orexin A, gastrin, gonadotropin- and thyrotropin-releasing hormones are highly abundant in hypothalamus and pituitary gland. The pE modification generally confers resistance to proteolysis and a higher aggregation propensity. Recently, QC emerged as a novel pharmacological target for Alzheimer's disease therapy because it was shown to catalyze the formation of highly pathogenic pE-Abeta peptides. However, functional QC studies in vitro are hampered by the lack of cell culture models with significant QC expression. Here we characterise the immortalized hypothalamic neuronal cell line GT1-7 with regard to expression of QC and its putative substrates by means of RT-PCR and immunocytochemistry. GT1-7 cells were analyzed in a proliferating state and after differentiation induced by serum deprivation. RT-PCR revealed robust expression of QC and an equal level of its homolog isoQC in differentiated GT1-7 cells. Among the peptide hormones, gonadotropin- and thyrotropin-releasing factor were detected by RT-PCR. Additionally, GT1-7 cells expressed significant amounts of the amyloid precursor protein as well as synaptophysin and synaptic vesicle protein 2A. In most cases, RT-PCR data were confirmed by immunocytochemical labellings. Our data suggest that GT1-7 cells are a promising in vitro model that allows to study the regulation of QC and isoQC expression, to identify novel QC substrates and to use it as a test system for QC inhibitors.