Investigation of autophagic genes expression in MKN-45 cells treated with anti-cancer drug (5-fluorouracil) nano-hydrogels

Abstract:

Background: Every year, in excess of one million instances of gastric carcinoma receive diagnoses on a global scale. Gastric malignancy stands as the fifth most frequently detected form of cancer internationally and is the seventh most widespread neoplastic ailment with a notable frequency rate

Aim: The objective of the present study was to explore the synergistic impact of nano-hydrogels in conjunction with the pharmaceutical agent 5-fluorouracil (5-FU) for the management of gastric cancer, centering on the MKN-45 cell line.

***Material and Methods*:** In this investigation, following an exhaustive evaluation of the physicochemical attributes of nano-hydrogels employing FTIR and SEM methodologies, the influence of pH on drug liberation was quantified through dialysis. Subsequent to this, assessments of cellular toxicity and the transcription of autophagy-associated genes were conducted utilizing MTT and PCR methodologies.

***Results*:** In summary, the outcomes of this study elucidated that decresed pH result in an enhanced drug release from nano-hydrogels, with this phenomenon displaying a saturation point. Moreover, the coalescence of hydrogel with 5-FU substantially augmented the transcription of autophagy-associated genes, namely Beclin-1 and LC3-II, after 3 and 5 days (P-value <0.05).

***Conclusion*:** It seems that the anticancer mechanism of 5-FU entails the stimulation of the expression of autophagy-related genes, a process that can be facilitated by the presence of nano-hydrogels.

Key words;: autophagy, silkworm cocoon fibroin nanohydrogel, 5-fluorouracil, LC3-II, Beclin-1