Amirah Mohd Gazzali et.al., Med Chem (Los Angeles) 2018, Volume 8
DOI: 10.4172/2161-0444-C3-045

Conjugation technique of peptides through click chemistry approach for drug targeting purposes

Amirah Mohd Gazzali[1], Samir Acherar[2], Céline Frochot[3] and Régis Vanderesse[2]
[1]School of Pharmaceutical Sciences-Universiti Sains Malaysia, Malaysia
[2]Laboratoire de Chimie Physique Macromoléculaire, France
[3]Laboratoire Réactions et Génie des Procédés, France

Statement of Problem: Peptides are short chains of amino acids that have certain advantages in drug research and among them are as targeting molecules in drug delivery. However, the nature of peptides does not allow them to undergo harsh reaction conditions during synthesis and chemical conjugations which could limit their application in drug targeting. This study described a synthesis technique called click chemistry which enabled the conjugation of a peptide with another molecule under a subtle condition with a good yield and short reaction time.

Methodology: The prerequisite for click chemistry is the presence of an azide or an alkyne group in the molecules to be conjugated. Peptides are commonly prepared through Solid-Phase Peptide Synthesis (SPSS) and one free amino group on the peptide molecule will need to be modified into an alkyne before a click reaction can be done. This modification was carried out at the completion of the SPSS in the solid phase peptide reactor through a series of steps. Immediately, the modified peptide was clicked with a second molecule that has an azide group. This technique is called solid-phase synthesis, which was conducted at room temperature for 72 hours. In addition, this experiment was also conducted in liquid phase synthesis by using protected peptides which was carried out in a microwave reactor proceeded for 60 minutes, also at room temperature.

Findings: Following purification by RP-HPLC, both techniques gave the intended product but microwave approach was found to be more efficient (83% yield at 60 minutes as compared to 51% at 72 hours).

Conclusion & Significance: This showed that microwave-based click chemistry synthesis approach is useful for the synthesis of peptide conjugates. It could increase the efficiency of the synthesis with a shorter reaction time and subtle reaction conditions. Click chemistry could hence be used in the preparation of peptide-drug complexes to assist in specific delivery of an active pharmaceutical ingredient.

Biography

Amirah Mohd Gazzali is a Junior Faculty Member at School of Pharmaceutical Sciences, Universiti Sains Malaysia, Malaysia. She has completed her Doctoral study in 2016 and obtained her Doctorate from Université de Lorraine, France. Her research interest is in drug targeting and drug delivery with specific interest in microwave-assisted synthesis and production of drug delivery vehicles. She is enthusiastic in her work as a Lecturer and Researcher and is always looking forward to build connection, to collaborate and to work together with scientists from all over the world.

amirahmg@usm.my

Notes: