



Design and Synthesis of Dendrimeric Analogs of Anticancer Peptides

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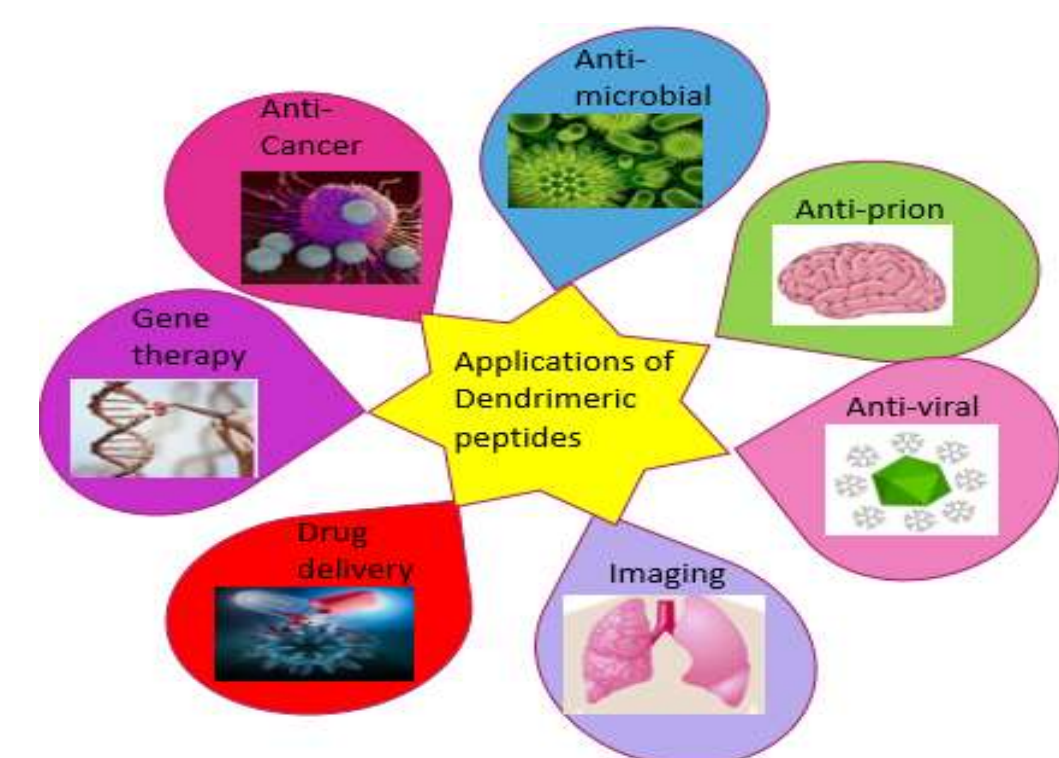
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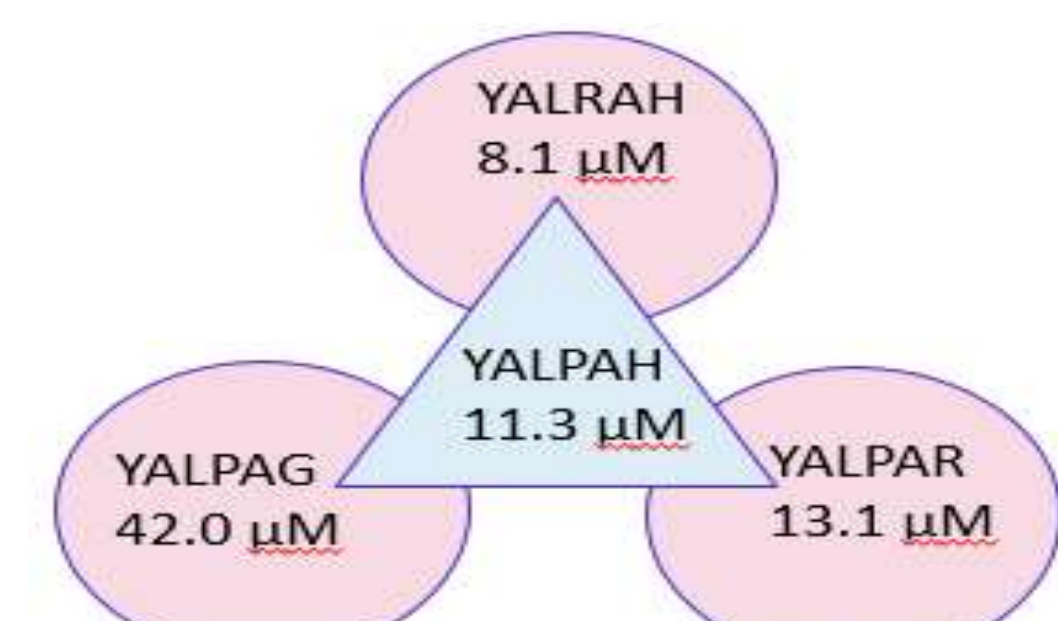
ABSTRACT

Dendrimeric peptides are branch-shaped macromolecules and possess a broad range of applications. Dendrimeric peptides have gained the attention of scientists due to improved metabolic stability, greater efficacy, and good pharmacokinetics. These peptides display better selectivity and are found to be more effective than their linear counterparts. According to a recent study on dendrimeric peptides, the four-armed peptide $\{[(LLKK)2]2\kappa C\}2$ displayed better selectivity in comparison to its linear peptide (LLKK)4 and showed better effectiveness than the 2-arm branched peptide $\{[(LLKK)2]2\kappa C$. 4-armed dendrimeric peptides have been selected as promising candidates for the treatment of cancer. In the current study, we have designed and synthesized dendrimeric peptide analogues of anti-cancer peptides obtained from heated hydrolysates of half-fin anchovy and leaves of the ginseng plant. The dendrimeric form of these peptides were synthesized using Wang resin as solid support. A Solid-phase Fmoc strategy was applied for the synthesis of peptides. Purification of the peptides was performed using reverse-phase HPLC. Different characterization techniques were used to elucidate the structure of peptides. Design, synthesis, and structural studies of dendrimeric peptides will be presented in this poster.



INTRODUCTION

Important features:
Enhanced biological activity, metabolic stability, solubility and bioavailability.



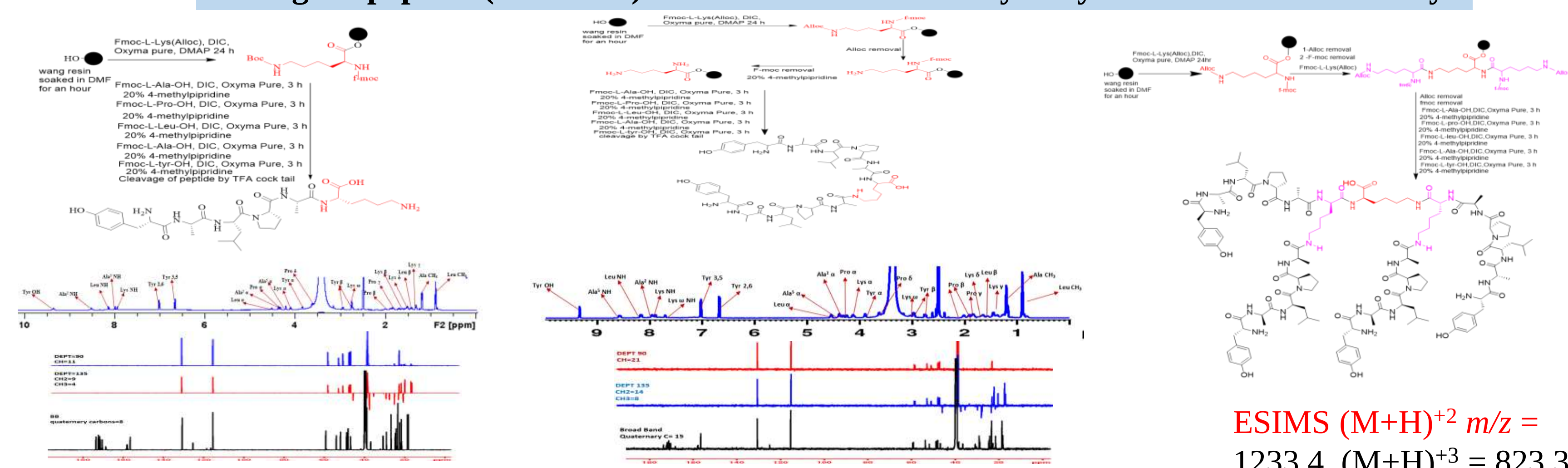
IC₅₀ values of natural peptide identified from half-fin anchovy and its synthetic analogues on inhibiting prostate cancer

OBJECTIVES

- To design and synthesize dendrimeric analogs of anticancer peptides
- To elucidate the structures of the synthesized peptides by the help of spectroscopic techniques
- To study the biological functions of dendrimeric peptides

EXPERIMENTAL

Analogues of peptide (YALPAH) identified from heated hydrolysates of half-fin anchovy

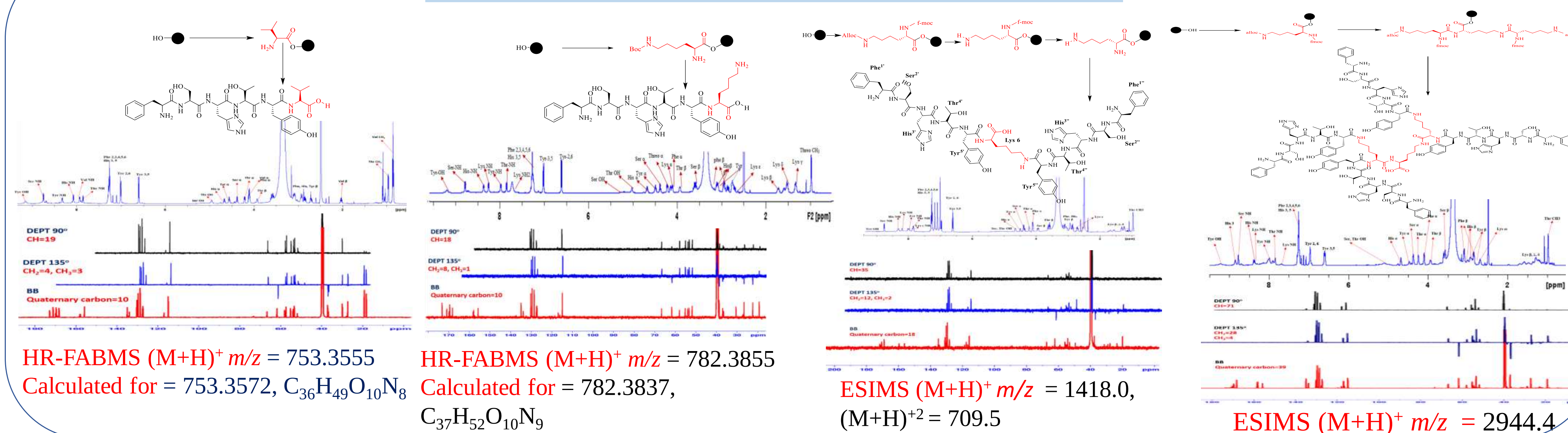


HR-FABMS (M+H)⁺ m/z = 662.3901
Calculated for = 662.3877, C₃₂H₅₂O₈N₇

HR-FABMS (M+H)⁺ m/z = 1177.6665
Calculated for = 1177.6621, C₅₈H₈₉O₁₄N₁₂

ESIMS (M+H)²⁺ m/z = 1233.4, (M+H)³⁺ = 823.3

Analogues of peptide (FSHTYV) isolated from ginseng plant



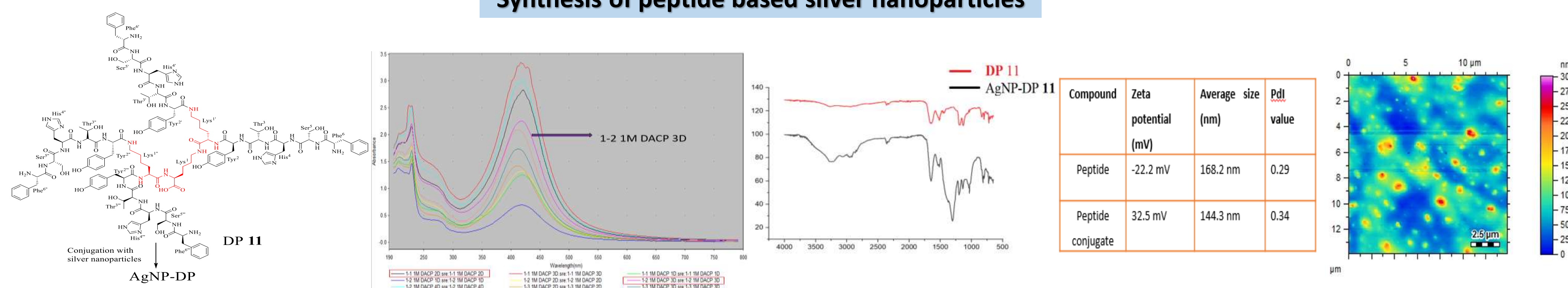
HR-FABMS (M+H)⁺ m/z = 753.3555
Calculated for = 753.3572, C₃₆H₄₉O₁₀N₈

HR-FABMS (M+H)⁺ m/z = 782.3855
Calculated for = 782.3837, C₃₇H₅₂O₁₀N₉

ESIMS (M+H)⁺ m/z = 1418.0,
(M+H)²⁺ = 709.5

ESIMS (M+H)⁺ m/z = 2944.4

Synthesis of peptide based silver nanoparticles



CONCLUSION

Dendrimeric and linear analogs of the natural bioactive anti-cancer peptides were synthesized. Structures of the peptides were confirmed by mass spectrometry and NMR studies. The synthesized tetrameric peptide is conjugated with silver nanoparticles and fully characterized with the help of DLS, AFM, UV-Vis, and FTIR analysis.

FUTURE PERSPECTIVES

Biological activities of the synthesized peptides will be performed.

Synthesized dendrimeric peptides will be used for the encapsulation of drugs and target delivery.

Nano-particles of the peptides will be synthesized to increase the potency and selectivity.

ACKNOWLEDGEMENTS

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- Liu, Z., Liu, X., Li, W., Luo, Q., Liu, J., and Wang, D. (2021). Anti-colon cancer activity tracking isolation of peptide from ginseng leaves and potential mechanisms evaluation in vitro and in vivo. *Journal of Peptide Science*, 27(4), e3297.