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PRELIMINARY STRUCTURE ACTIVITY STUDIES ON HYAL1 INHIBITORS

J Addotey, M Lechtenberg, F Petereit, I Lengers, J Jose and **A Hensel**
University of Münster, Germany

Statement of Problem: Human hyaluronidase-1 (Hyal-1) is an enzyme strongly involved in the regulation of extracellular matrix by balancing the deposition and potential degradation of hyaluronic acid (HA) in the tissue. The inhibition of Hyal-1 by specific inhibitors might be a promising target for improved wound healing, tissue regeneration, and looking at renal function also for induction of diuresis. Following the discovery of the inhibitory effects of isoflavonoids from the roots of *Ononis spinosa* L. on Hyal-1 in our previous work, further studies have been conducted on selected flavonoid/isoflavonoid compounds from natural sources with the aim to study structure - activity relationships. Although glycosides of these compounds abound and some have been proven to show anti-hyaluronidase activity, the aglycones were chosen because generally they are known to exhibit higher anti-hyaluronidase effect.

Methodology: By using surface-displayed human Hyal-1 on ***Escherichia coli*** F470, HA as substrate and stains-all method for quantification of undegraded, high molecular polymer, the enzyme activity can be determined easily. Apigenin (flavonoid hyaluronidase inhibitor), Biochanin A (isoflavonoid present in roots of ***Ononis spinosa L***.) and Maackiain (pterocarpan present in roots of ***Ononis spinosa L***.) were used as representatives of the above classes. Glycyrrhizinic acid, a known Hyal-1 inhibitor was used as a standard.

Findings: At a concentration of 250 µM, Maackiain and Apigenin were found to be inactive. The IC50 values obtained for Glycyrrhizinic acid and Biochanin A were 181 µM and 126 µM respectively.

Conclusion & Significance: Strong inhibitory activity (comparable to standard) against Hyal1 was found in the isoflavonoid with the flavonoid and pterocarpan exhibiting virtually no activity. This information will serve as a guide toward more elaborate structure-activity studies.

Conclusion & Significance: The results of this study will support the use of this plant extract for diabetic healing over the use of commercially available synthetic drugs.

Recent Publications

1. Monica Mame Soma Nyansa, Patrick Doe Fiawoyife, Nana Ama Mireku-Gyimah and John Nii Adotey Addotey (2017) Stability-indicating HPLC method for the simultaneous determination of paracetamol and tramadol hydrochloride in fixed-dose combination tablets. International Journal of Biomedical Science and Engineering 5(4):41–47.
2. Addotey J N A and Adosraku R K (2016) Pilot production of 5-HTP from the seeds of Griffonia simplicifolia. World Journal of Pharmacy and Pharmaceutical Sciences 5(6)204–221.
3. Cudjoe E K, Addotey J N A, Okine N N A, Adosraku R K and Annan K (2016) Isolation and development of an HPLC method for the quantification of a biomarker in the roots of Paullinia pinnata. Int J Pharm Sci Res 7(8):3446–52.
4. John Nii Adotey Addotey and Monica Mame Soma Nyansah (2016) Quality assessment of some topical polyherbal preparations on the Ghanaian Market. World Journal of Pharmacy and Pharmaceutical Sciences 5(4)461–472.

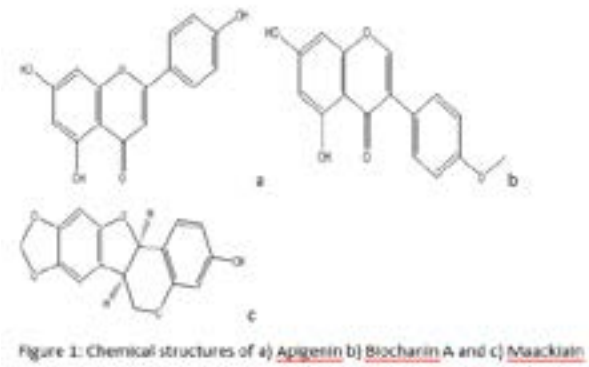

Figure 1: Chemical structures of a) Apigenin b) Biochanin A and c) Maackiain

Biography

J Addotey is a recipient of the German Academic Exchange Service (DAAD)/Government of Ghana joint scholarship for PhD studies. This scholarship is awarded to young Ghanaian researchers of superior academic and research achievement in order to obtain PhDs in Germany and to further their career goals. He is self-motivated Young Researcher and Lecturer looking to network and collaborate with other researchers worldwide towards solving emerging challenges in natural products research. His primary interests are bioactivity guided isolation and characterization of compounds from natural sources and method development for the analysis of drug substances of natural origin.

j_addo01@uni-muenster.de