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Polyfunctional flavonoids: Design, synthesis and biological evaluation against Alzheimer's disease

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Objective: To design the synthesis and biological evaluation of polyfunctional flavonoids against Alzheimer's disease.

Methods: The various flavonoid derivatives used were synthesized by Baker-Venkataraman rearrangement. Synthesized compounds were characterized by different analytical techniques like NMR, IR and mass spectrometry. All compounds were tested for the estimation of acetylcholinesterase inhibitory activity using Ellman's method, *in vitro* estimation of advanced glycation end products (AGEs) formation inhibitory assay and oxygen-radical absorbance capacity using DPPH method. The binding patterns of potent compounds with AChE enzyme were analyzed by molecular docking studies using the Glide program of Schrodinger software.

Results & Discussion: Out of all the synthesized compounds, 5m, 5b and 5j were the most potent acetylcholinesterase inhibitors. Additionally, most of the compounds exhibited radical scavenging activity comparable to ascorbic acid with considerable AGEs formation inhibitory activity as the fluorescence of AGEs was shown to be remarkably inhibited by all the synthesized compounds. The molecular docking study showed that potent compounds displayed good anticholinesterase activity to be able to bind with both CAS and PAS pockets of the AChE.

Conclusion: On the basis of the present study it can be concluded that synthesized compounds are effective in modulating three pathophysiological pathways of Alzheimer's disease and may be explored for its treatment.

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