Inhibition of IL-2 production by novel small molecules using building blocks from reduced chalcones and a substituted proline

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Background: Immunosuppressants are a class of drugs that can inhibit the immune response, mainly through the inhibition of IL-2 production, among other mechanisms. The most studied representatives of this class of therapeutic agents are Cyclosporin- A, FK506, and Rapamycin. Due to the structural complexity of these molecules, their chemical synthesis has been difficult and expensive. Objective: To synthesize novel small molecules that are structurally simple and that can be inhibitors of IL-2 production. These molecules are proposed to constitute new hypothetic immunosuppressant agents. Method: These small molecules were obtained through simple, cheap and efficient methods of well-known synthetic transformations. The molecules were synthetized in few steps through a highly convergent route and produced high yields. Results: Among the six compounds synthetized, compounds 4a1 and 4b2 showed interesting inhibitory activity. At higher concentration, compound 4a1 showed significant activity. However, the isomer 4a2 showed considerably less activity than 4a1, perhaps, for the high stereoselectivity ligand-receptor. Furthermore, the evaluation of the effect of novel molecules on the viability of mononuclear cells was carried out. The effect of the molecules proved to be innocuous. Conclusion: The data obtained from the inhibition of IL-2 production and low toxicity in mononuclear cells are promising for the development of future studies on these new hypothetic immunosuppressant agents.

Chalcones

IL-2 production

Immunosuppressants

N-substituted L-proline

Small molecules

Stereoselectivity

1 benzyl 2 (1,5 diphenylpenta 2,4 dien 1 yl) pyrrolidine 1,2 dicarboxylate

1 benzyl 2 [3 (4 chlorophenyl) 1 phenylallyl] pyrrolidine 1,2 dicarboxylate

2 [3 (benzo[d][1,3]dioxol 5 yl) 1 phenylallyl] 1 benzyl pyrrolidine 1,2 dicarboxylate

chalcone derivative

immunosuppressive agent

interleukin 2

proline derivative

rapamycin

unclassified drug

Article

biological activity

cell viability

concentration response

drug receptor binding

drug screening

drug structure

drug synthesis

isomer

mononuclear cell

priority journal

protein synthesis inhibition

stereoselectivity

structure analysis