XXVII ENCONTRO LUSO GALEGO DE QUÍMICA

22-24 NOVEMBRO 2023
PORTO, PORTUGAL

LIVRO DE RESUMOS

Colegio Oficial de Químicos de Galicia

ASOCIACIÓN DE QUÍMICOS DE GALICIA

SOCIEDADE PORTUGUESA DE QUÍMICA

FICHA TÉCNICA

TÍTULO
Livro de Resumos do XXVII Encontro Luso-Galego de Química

EDITORES
Raquel P. Rocha, Joaquim L. Faria

EDITORES ASSOCIADOS
Cláudia G. Silva, Maria José Sampaio, O. Salomé G.P. Soares

EDIÇÃO
Sociedade Portuguesa de Química
Av. da República, 45 – 3º Esq.
1050-187 Lisboa – Portugal

DATA
Novembro de 2023

TIRAGEM
50 exemplares

ISBN (versão impressa)
978 989 8124 40 1

ISBN (versão digital)
978 989 8124 39 5

DESIGN GRÁFICO
Joana Macedo

IMPRESSÃO
Efeitos Gráficos Unipessoal Lda

CATALOGAÇÃO RECOMENDADA
Livro de Resumos do XXVII Encontro Luso-Galego de Química
Faculdade de Engenharia da Universidade do Porto, Porto, Portugal (2023)

Este livro de atas foi produzido a partir dos trabalhos submetidos diretamente pelos autores. Apenas foram introduzidas pequenas alterações de edição, o que não alterou o conteúdo científico. A versão final online foi estabelecida para o XXVII Encontro Luso-Galego de Química, de acordo com o modelo publicado. Os autores são responsáveis pelo conteúdo científico dos seus trabalhos.

Revealing the immunomodulatory potential of pyrazoles and exploring structure-activity relationships

J. M. Silva[1,2*], S. Rocha[1], V. L. M. Silva[3], A. M. S. Silva[3], F. Moreira[2,4], E. Fernandes[1], M. Freitas[1]

[1] LAQV-REQUIMTE, Laboratory of Applied Chemistry, Department of Chemical Sciences, Faculty of Pharmacy, University of Porto, 4050-313 Porto, Portugal
[2] ESS, Polytechnic of Porto, Rua Dr. António Bernardino de Almeida, 400 4200 - 072, Porto, Portugal
[3] LAQV-REQUIMTE, Department of Chemistry, University of Aveiro, 3810-193 Aveiro, Portugal
4 CISA, ESS, Polytechnic of Porto, Rua Dr. António Bernardino de Almeida, 400 4200 - 072, Porto, Portugal

jorgems99@gmail.com

Inflammation is a complex and tightly regulated process by a cascade of events that involves the production of prostaglandins (PG) by the inducible isoform cyclooxygenase 2 (COX-2) and the production of reactive pro-oxidant species. Conversely, COX-1, which is consistently present in a variety of tissues, has traditionally been categorized as the primary isoform responsible for maintaining the balance of prostaglandin production. Given the adverse effects associated with currently employed anti-inflammatory agents, there is an urgent need to develop novel and efficacious compounds capable of regulating the inflammatory cascade. In this sense, a panel of 28 structurally related pyrazoles were evaluated through the inhibition of human COX-2 and ovine COX-1 activity; the *ex vivo* production of PGE_2 in human whole blood; COX-2 expression in human leukocytes; and human leukocytes' oxidative burst. The results revealed that some of the tested pyrazoles had a significant inhibitory effect on COX-2 activity. Pyrazoles 4 and 11B (Fig. 1) stood out as the most potent inhibitors. Pyrazole 11B exhibited greater inhibitory activity against COX-2 than COX-1, while pyrazole 14 displayed selective inhibition of COX-1, with an IC_{50} value lower than 1 μM. Interestingly, pyrazoles 14 and 16 (Fig. 1) downregulated the COX-2 expression in human leukocytes. Several of the tested pyrazoles, namely compound 4, showed a potential suppressive effect ($IC_{50} < 5$ μM) against human leukocytes' oxidative burst. In addition, various pyrazoles were able to inhibit both COX-2 activity and oxidative burst, particularly the pyrazoles 1B, 4 and 11B.

This study provides important insights into pyrazoles and their promising modulatory effect against the inflammatory process, which could contribute to the design and development of new anti-inflammatory molecules.

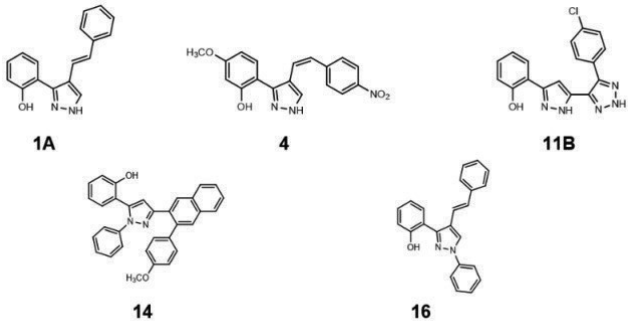

Fig.1. Chemical structure of some of the studied pyrazoles.

Acknowledgements
Funding: This work received financial support from national funds (FCT/MCTES, Fundação para a Ciência e Tecnologia and Ministério da Ciência, Tecnologia e Ensino Superior) through the project UIDP/50006/2020. Additionally, this work was also supported by EXPL/MED-QUI/0815/2021. S. Rocha acknowledges FCT the financial support for the PhD grant (PD/BD/145169/2019). M. Freitas acknowledges her CEEC Individual 2020.04126.CEECIND/CP1596/CT0006 and LAQV-REQUIMTE for her contract under the reference LA/P/0008/2020.