

DIFFERENT PHARMACOLOGICAL MODULATION OF TRPM6 AND TRPM7 PROTEINS IN HUMAN CARDIOMYOCYTES

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TRPM7 and its homologue TRPM6 are part of the melastatin subfamily of TRP channels and are crucial for the cellular uptake of divalent cations such as Ca^{2+} and Mg^{2+} . Recently, we have found that both proteins are also present in human cardiomyocytes [1].

The goal of this study was to investigate various extracellular factors, such as medium ionic composition, acidosis, and TRP channel inhibitors (2-APB and carvacrol), on the expression of TRPM6 and TRPM7 in native cardiomyocytes.

In this study, immunofluorescence was used to detect TRPM proteins. Immunofluorescence was stronger in media containing divalent cations than in those without, and expression increased after 12 hours of incubation. Inhibitors like 2-APB and carvacrol reduced TRPM7 but increased TRPM6 immunofluorescence. At acidic pH, both proteins' expression increased in divalent cation conditions, but in divalent cation-free conditions, TRPM7 was suppressed.

This study confirms the presence of TRPM6 and TRPM7 in human cardiomyocytes and demonstrates that extracellular factors modulate their expression. Crucially, the results show that TRPM6 and TRPM7 are not interrelated into their regulation. Their divergent responses to external stimuli suggest that in cardiomyocytes, these proteins function independently and compose distinct channels.

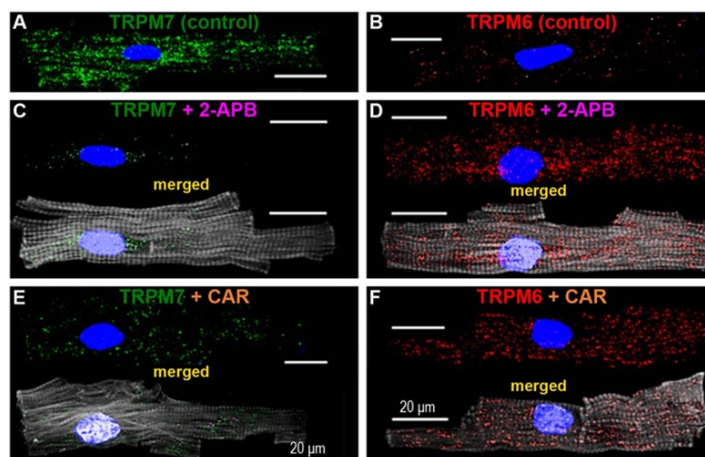


Fig. 1. Effect of 2-APB and carvacrol (CAR) on the immunofluorescence of TRPM6 and TRPM7 in human cardiomyocytes. Illustration of cardiomyocyte staining with anti-TRPM7 (A, C, E) or anti-TRPM6 (B, D, F) in the absence of drugs (A, B) and in the presence of either 2-APB (C, D) or CAR (E, F). Alexa Fluor 546 (*red*) – for TRPM6 protein; Alexa Fluor 488 (*green*) – for TRPM7 protein; Hoechst (*blue*) – for the nucleus; Alexa Fluor 405 (*surrogate grey*) – for F-actin cytoskeleton.