# β2-adrenergic receptor polymorphism in intracellular signalling pathways

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## Introduction:

Research on the cognition of the human genome resulted in the publication of human DNA sequences at the beginning of the 21st century. Thanks to these discoveries, it became possible to learn the location, sequence and mutation of many genes that play an important role in the pathogenesis of certain diseases and are the cause of individual sensitivity to the drug administered [1].

The β2-adrenergic receptor belongs to an important family of G-protein coupled receptors (GPCRs). β2-AR is an extremely important molecular target for drugs used in the treatment of asthma and heart failure. β2-AR is encoded by the ADRB2 gene present in many polymorphs, differing in the types of amino acid residues. Single nucleotide polymorphism (SNP) can lead to differences in the structure and action of the gene-encoded protein, which in turn affects how the protein interacts with the drug molecule, the activation of the receptor, and consequently the course of the disease and the success of the therapy used [1].

Literature data indicate the relationship of polymorphism with the exacerbated course of many chronic diseases such as circulatory failure, arterial hypertension with concomitant obesity, asthma. Receptor polymorphism may also influence the variable response to drugs used, as well as the faster development of tolerance to them [1].

Since the presence of polymorphism may result in differences in intracellular signalling, the present research determined differences in the activation level of intracellular signalling pathways for selected agonists.

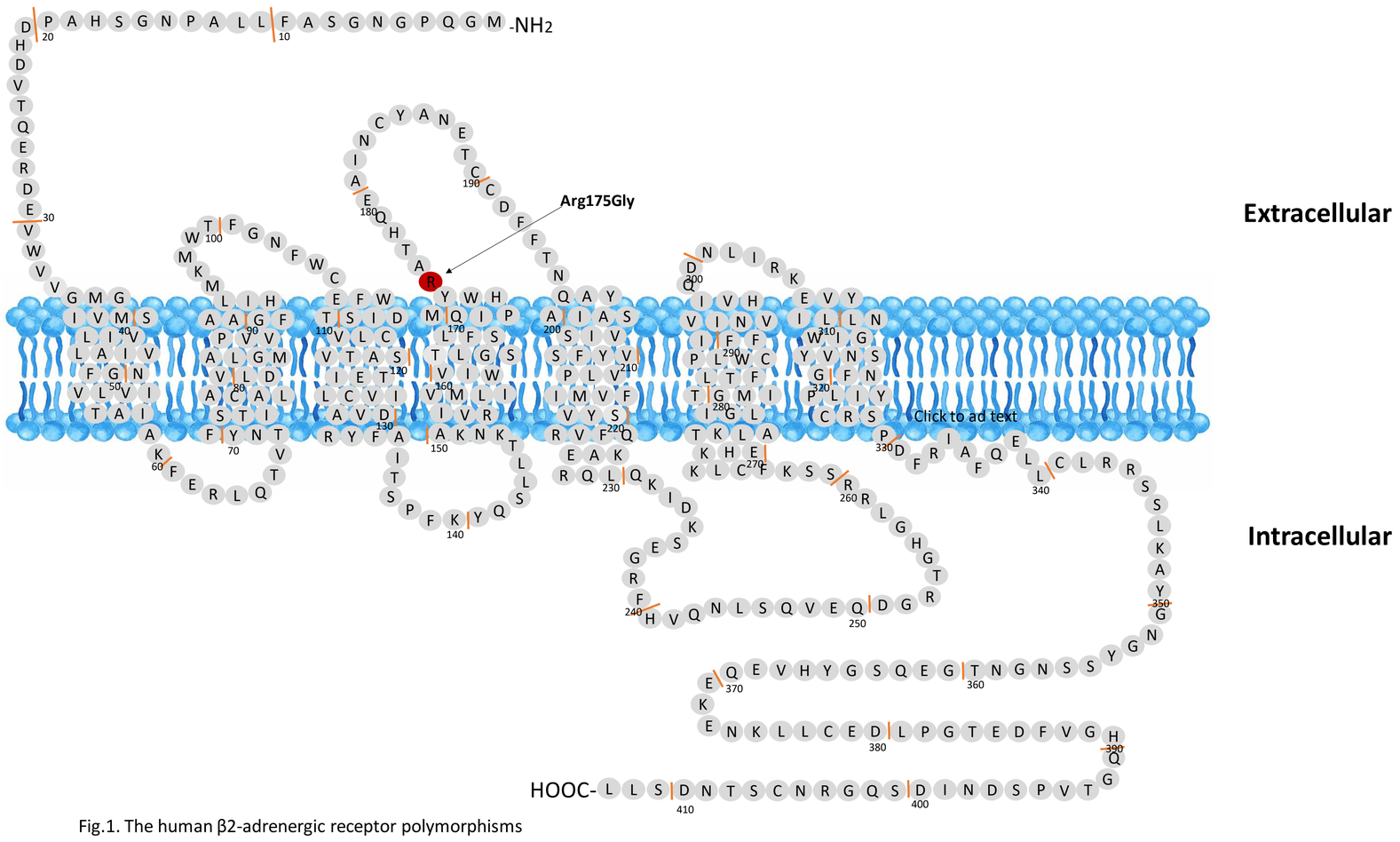


Fig.1. The human β2-adrenergic receptor polymorphisms

## Methods:




The western blot technique examined the level of phosphorylation of proteins characteristic for the substrates of cellular kinases in order to determine the activity of individual pathways. ERK is an intracellular kinase that is involved in the regulation of cell proliferation and differentiation.

## Conclusion:

No significant differences were observed between the Arg175Gly polymorph and the wild type beta2-adrenergic receptor in the HEK-293 cell line.

## References:

1. Litonjua AA, Gong L, Duan QL, i in. (2010). Very important pharmacogene summary ADRB2. Pharmacogenetics and Genomics, 20(1):64–69.

## Results: