

The family of human insulin-like peptide hormones includes insulin, insulin-like growth factors 1 and 2 (IGF-1 and 2), relaxins 1-3, and INSL3-6 polypeptides. These polypeptide hormones share similar 3D structures while retaining a similar disulfide bridge pattern and lower or higher primary sequence similarity. It is supposed that these hormones may have evolved from the same hypothetical evolutionary precursor probably already before evolution of vertebrates. These hormones have different functions from regulating glucose entry into cells and regulating the body's basal energy balance, through fetal development, growth and healing of the organism to important functions in reproduction of organisms. In addition, these peptides may be involved in the development of diseases such as *diabetes mellitus*, growth disorders but also cancer. Mimetics are compounds that mimic the structure of natural molecules and agonize or antagonize their biological effects. Their main advantage over natural peptide hormones may be in their greater metabolic stability, cheaper production or easier route of administration to the body, but also in altered biological activity. Hormone mimetics can therefore be used for treatment of many diseases. In this review we will focus on the known mimetics of the insulin family of hormones, synthetic and structural strategies used in their preparation and the known applications of these substances.