MOLECULAR EVIDENCE OF THE PRESENCE OF ROS-GC IN THE TESTIS

ANNA JANKOWSKA, BEATA BURCZYŃSKA and JERZY B.WARCHOŁ
Department of Radiobiology and Cell Biology, University of Medical Sciences,
Święcickiego 6, 60-781 Poznań, Poland

Cyclic GMP and Ca\(^{2+}\) are intracellular messengers that mediate a series of key events in mammalian fertilisation. cGMP is produced by various isoforms of guanylate cyclase (GC). The GC family consists of soluble and particulate isoenzymes. NO and CO activate the soluble forms of GC. The particulate forms are divided into two subfamilies: extra- and intra-cellularly regulated GCs. The extracellularly regulated GCs are activated by the binding of small peptides (ANF, CNP or STa) to their extracellular domains. The intracellularly regulated GCs (ROS-GC1 & 2 and ONE-GC) respond to Ca\(^{2+}\) signals that are conveyed to them through small EF-hand Ca\(^{2+}\) binding proteins (GCAPs – 1 and 2; and CD-GCAPs – S100\(\beta\) and neurocalcin). In the testis, the presence and functional activity of various guanylate cyclases, such as soluble guanylate cyclase, natriuretic receptor forms – ANF-RGC and CNP – have been reported. Recent evidence indicates the presence of a calcium-modulated GC (membrane guanylate cyclase), ROS-GC1, in the testis. Two different regions of ROS-GC1, corresponding to the kinase-like and catalytic domain of the cyclase were amplified from total RNA through reverse transcription followed by a polymerase chain reaction (PCR) with species specific primers. This study for the first time, via a molecular approach, shows the presence of a calcium-modulated membrane guanylate cyclase signalling system in the testis.