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In eukaryotes, signals from outside the cells are transmitted through various pathways. After entering the nucleus, those signals proceed to gene expression by RNA polymerase II (Pol II) via their acceptor proteins. Recent progress in research has made it apparent that the nuclear signals proceed along the pathways through certain mediators, cofactors, and chromatin-modifying factors. It is now known that signals from outside the cells can be classified into two classes. One is the pathway through which the hydrophilic ligands bind to the receptors on the cell membrane and their signals pass through the cytoplasm. In the other, the hydrophobic ligands transmit signals directly via the nuclear receptors. This symposium will focus on the latter pathway under the theme "How are the signals transmitted to Pol II via nuclear receptors and associating factors and their relation to gene expression." Speakers studying the medical treatment of diseases caused by nuclear receptor dysregulation will present their results and discuss the regulation of nuclear signal transmitters at the molecular level.