sciendo ASIAN BIOMEDICINE DOI 10.1515/abm-2020-0025 — Asian Biomed (Res Rev News) 2020; 14(5):175–176

Editorial **Open access**

Measuring signal transduction and transcription molecules for clinical use

Signal transduction is the process by which a chemical or physical signal is transmitted through a cell, giving rise to a chain of molecular events that finally gives rise to a cellular response [1]. Typically, the primary messenger molecule or ligand binds to a cell receptor. The binding of the ligand and receptor results in the creation of second messengers. The second messengers then activate responses in the cellular cytosol and the nucleus of the cell [2]. This chain of events elicited by ligand binding (or signal sensing) to a receptor, which results in cellular cytosol and nuclear responses, is known as a signaling pathway. The Wnt signaling pathways are a group of signal transduction pathways that form the basis of nearby cell–cell (or paracrine) communication or same-cell (or autocrine) communication [3].

After initiating cellular communication via transduction signals, the transcription processes use transduction signals and transcribe them to cellular responses [1]. β-Catenin is most commonly thought of as a transcriptional coactivator [4]. Many intracellular targets can be activated by Wnt β-catenin pathways [4]. During Wnt signaling, β-catenin remains in a protein complex in the cytosol and interacts with the Wnt signalosome, resulting in the release of β-catenin from the protein complex [4]. Some of the β-catenin released can enter the nucleus and activate a transcription process [1, 4, 5]. Signaling pathways can interact with one another to form networks, which allow cellular responses to be coordinated [6]. The molecular events underlying cellular responses are the basic mechanisms controlling cell growth, proliferation, metabolism, and other processes leading to health or disease.

Signaling by the Wnt family of secreted glycolipoproteins via the transcription coactivator β-catenin controls embryonic development and adult homeostasis [7]. In this issue of *Asian Biomedicine*, Hanife Guler Donmez reports on β-catenin expression in cervicovaginal smears during the regular menstrual cycle as detected immunocytochemically [8]. The study shows that there are differences in the activity of Wnt signaling and the H-scores of squamous epithelial cells between the vaginal smears obtained during the proliferative phase and those from the secretory phase of the menstrual cycle. The presence of cycle-dependent changes in Wnt/β-catenin signaling may suggest a role for this pathway in the maturation of stratified squamous epithelium. Moreover, the normal pattern of β-catenin expression during the different phases of the menstrual cycle may have some bearing on future biomarker studies in precancerous/cancerous cases, as well as in tracking cancer progression [9, 10].

Measuring signal transduction and transcription has potential for clinical use. It may allow early screening and early diagnosis of potential problems in clinical settings. Early diagnosis can lead to early treatment and may improve prognosis of patients [11–20].

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