# Multifunctional window glass with automatic solar energy control

## A joint research launched between AIST and NSG for commercialization of product

**Ping Jin**
Materials Research Institute
for Sustainable Development

E-mail:
p-jin@aist.go.jp

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The AIST and the Nippon Sheet Glass Co., Ltd. have decided to develop a novel window glass for energy saving, through a joint research. The glass uses a semiconductor-to-metal phase transition material for automatic solar heat control, together with other materials for optical tailoring and multifunctional performance. The newly developed window glass is smart as to shade the extra solar radiation in summer but to introduce solar heat in winter, changing automatically in response to the environment temperature. Multifunction performances are achieved through precise material selection and structural optimization.

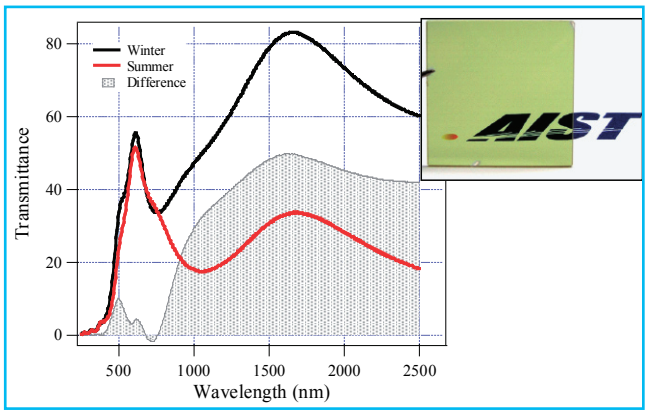


Figure: Spectral transmittance of a sample for winter (black) and summer (red) and the difference (shadow area). The appearance of sample is shown on the right hand inset.



# Stress hormones regulate the circadian expression of hepatic genes

**Katsutaka Oishi**
Institute for Biological
Resources and Functions

E-mail:
k-ooishi@aist.go.jp

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Circadian clock exists even in peripheral tissues, as well as in the suprachiasmatic nucleus (SCN; the central clock in mammals). About 10% of hepatic genes are transcriptionally regulated in a circadian manner. We found that two types of circadian controlled genes are located in the liver; one type is governed by core components of the circadian clock such as CLOCK and BMAL, and the other is directly dependent on the glucocorticoid hormones secreted from the adrenal gland in a circadian manner. Multiple pathways seem to participate in conveying the time cue from the SCN to peripheral clocks in mammals.

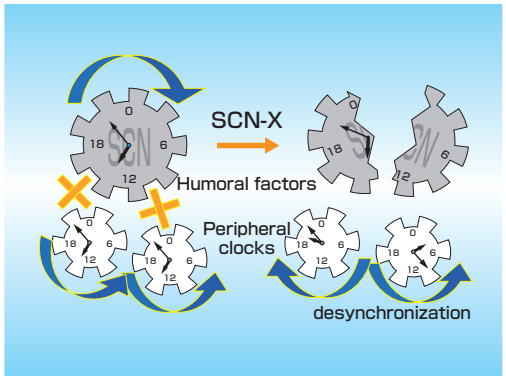


Figure 1: The central clock in the SCN regulates peripheral clocks.

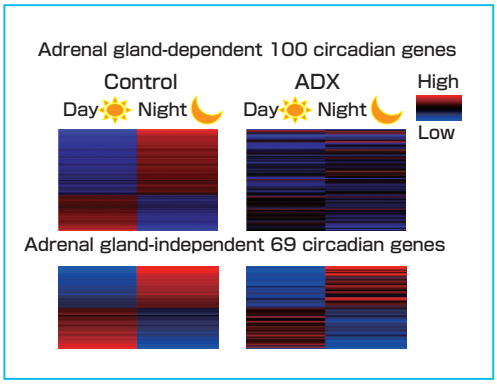


Figure 2: Glucocorticoids regulate the circadian expression of hepatic genes.