Medical Xpress

Unique platform ID'd for producing cone photoreceptors

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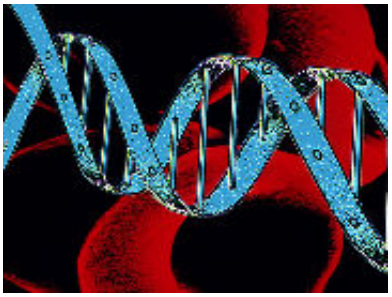

(HealthDay)—A member of the Cerberus gene family, *Coco* (*Dand5*), appears to be involved in differentiation into S-cone photoreceptors by blocking BMP/TGFβ/Wnt signaling, according to an experimental study published online Oct. 1 in *Development*.

In an effort to obtain a source of human cones for cone transplantation, Shufeng Zhou, from Maisonneuve-Rosemont Hospital in Montreal, and colleagues examined gene expression in the developing and adult mouse retina.

The researchers identified expression of *Coco* (*Dand5*) in the developing and adult mouse retina. Human embryonic stem cells (hESCs) differentiated into S-cone photoreceptors upon exposure to recombinant COCO, and they developed an inner segment-like protrusion and could

degrade cGMP on light exposure. The unique S-cone population moved toward a mixed M/S-cone population on addition of thyroid hormone. COCO-exposed hESCs spontaneously developed into a cellular sheet of polarized cone photoreceptors when cultured at confluence for a prolonged period. Dose-dependent and synergistic activity was seen for COCO and IGF1 for blocking BMP/TGFβ/Wnt signaling; exposure to BMP, TGFβ, or Wnt-related proteins correlated with blocking of cone-inducing activity.

"Our work thus provides a unique platform to produce human cones for developmental, biochemical, and therapeutic studies and supports the hypothesis that photoreceptor differentiation operates through an S-cone default pathway during human retinal development," the authors write.

More information: Abstract
Full Text (subscription or payment may be required)