This Week in The Journal

● Cellular/Molecular

β-Catenin and Acetylcholine Receptor Clustering

Bin Zhang, Shiwen Luo, Xian-Ping Dong, Xian Zhang, Chunming Liu, Zhenge Luo, Wen-Cheng Xiong, and Lin Mei

(see pages 3968–3973)

It's a story that has touched the careers of many neuroscientists: the clustering of acetylcholine receptors (AChRs) at the neuromuscular junction. This week, Zhang et al. add β-catenin to a list of molecular characters that already includes agrin, rapysn, and MuSK (muscle-specific tyrosine kinase). The authors found β-catenin in a two-hybrid screen using rapsyn as bait. They confirmed that the interaction was direct, and that β-catenin coprecipitated with AChR complexes in control myotubes, but not in myotubes derived from rapsyn $^{-/-}$ mice. In a nicely controlled set of experiments, suppression of β-catenin by a short hairpin RNA reduced agrin-induced clustering of AChRs in C2C12 myoblasts. Although β-catenin is multifunctional, its action here did not involve the Wnt signaling pathway. Rather, an interaction of β-catenin with α-catenin was required. Thus, the authors suggest that β-catenin acts downstream of rapsyn to affect AchR clustering through cytoskeletal linkages.

▲ Development/Plasticity/Repair

Wnt Signaling and Retinal Regeneration

Fumitaka Osakada, Sotaro Ooto, Tadamichi Akagi, Michiko Mandai, Akinori Akaike, and Masayo Takahashi

(see pages 4210–4219)

Regeneration in the mammalian retina is extremely limited. This week, Osakada et al. try to tap the potential for Müller glia-derived retinal progenitors using rodent retinal explant cultures as an injury model. In the explants, photoreceptor loss was accompanied by an increase in cells identified as Müller glia reentering the cell cycle, and a few such cells acquired properties of retinal progenitors. Treatment of the explants with Wnt3a for 4 d increased dividing cells as identified with 5′-bromo-2′-deoxyuridine (BrdU), an effect that was blocked by a Wnt antagonist. Wnt3a also increased retinal progenitors as well as the level of *cyclin D1* transcripts, a downstream target of the Wnt/β-catenin signaling pathway. *In vivo*, retinal injury induced by intravitreal NMDA injection also increased Wnt signaling. Seven days after withdrawal of Wnt3a, a few BrdU-positive cells expressed rhodopsin, consistent with differentiation of progenitors into photoreceptors. Retinoic acid, critical for photoreceptor genesis, enhanced the latter effect.

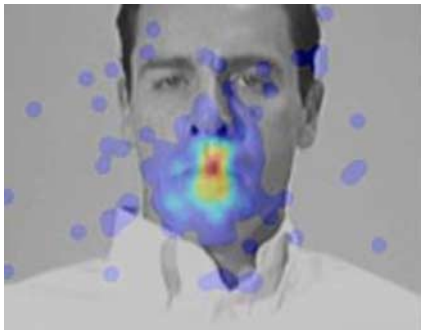
■ Behavioral/Systems/Cognitive

Making Eye Contact

Michael L. Spezio, Po-Yin Samuel Huang, Fulvia Castelli, and Ralph Adolphs

(see pages 3994–3997)

We've all met people who don't make eye contact during conversations, apparently preferring instead to look down or away. This week, Spezio investigated the eye contact of S.M., a women with bilateral focal lesions of the amygdala. In previous studies, this subject was unable to judge the emotional content in facial photographs. In the current study, S.M. and a set of female control subjects responded to pre-rehearsed questions during a face-to-face conversation with a professionally trained actor. Compared with the control subjects, S.M. showed normal overall gaze to the face. However, S.M. made no eye contact; instead, her gaze was mostly directed to the actor's mouth. The authors suggest that the altered gaze pattern in S.M. may reflect the proposed role of the amygdala in top-down visual attention to faces and other social stimuli. For S.M., lacking an amygdala, mouth movement likely represents the salient visual cue.



Spezio et al. plotted the normalized number of fixations while a patient with bilateral amygdala lesions had a face-to-face conversation with this actor. Note that the patient made no fixations on the eyes. See the article by Spezio et al. for details.

♦ Neurobiology of Disease

Ischemic Axonal Injury in Neonatal Mice

William J. McCarran and Mark P. Goldberg

(see pages 4220–4229)

The periventricular white matter is selectively vulnerable to ischemia in premature infants, leading to profound long-term morbidity. This susceptibility may result from glutamate-receptor-mediated damage to developing oligodendrocytes (OLs). Because axons are also affected by ischemia, but not by glutamate agonists, it has been suggested that ischemic axonal injury is an indirect result of OL injury. The first postnatal week in mice corresponds to the most vulnerable period for premyelinating oligodendrocytes in humans. Thus, McCarran et al. investigated ischemic axonal injury in acute brain slices of young mice [postnatal day 3 (P3) to P21]. Oxygen-glucose deprivation caused delayed axonal degeneration as manifest by beading, fragmentation, and loss of axons tagged with yellow fluorescent protein. As in the adult, block of AMPA/kainate receptors protected axons at P10 and P21 from ischemic injury. However, axons were not protected at P3 and P7, suggesting that axonal injury during the premyelinated stage involves additional mechanisms.