

From the library

Remembrance of things past

“Aware that his family would be apprehensive concerning his cataract operation, he wrote reassuringly that he could now distinguish light and dark in his left eye, but it would take several weeks to determine whether the vision would return enough to be useful. The removal of a cataract in those days was a primitive procedure, and as he said quite a bad ordeal. ‘I suffered very severely for the first few days after the operation, and they had to give me typhoid fever injections to combat the inflammation in the eye—it seems an artificial fever will accelerate absorption. The injections gave me high fever and chills that nearly shook me to pieces.’ ” (Lye Leveriech. *Tom: the Unknown Tennessee Williams*. New York: W W Norton & Co, 1995:400.)

Face-brain development requires vitamin A

Ophthalmologists are commonly members of the cranial facial anomaly teams. In evaluating patients with complex facial cranial bone and intracranial anomalies, it has been felt that it was the underlying intracranial anomalies (central nervous system) that determine the abnormal facial growth. Recent work, however, suggests that similar chemicals and proteins shape both the face and the brain and it is this commonality of important chemical transducers that results in patients acquiring abnormal facial and intracranial abnormalities. At least in some circumstances retinoic acid or vitamin A appears to be important in sending signals to genes that are essential for normal forebrain and facial development. Whether vitamin A deficiencies may play a part in clinical syndromes of cranial facial anomalies has yet to be determined. (*New Scientist* 2000;26 Feb:16.)

Axonal guidance problems lead to optic nerve hypoplasia and associated disorders

In a similar fashion it now appears that the reason why optic nerve hypoplasia is commonly associated with midline intracranial anomalies is that similar chemicals are important for neuronal guidance in the development of normal visual pathways as well as other midline non-visual pathways. In the mouse, deficiency of netrin-1 at the optic disc produces optic nerve hypoplasia. In these same animals intrinsic hypothalamus patterning is also affected in netrin-1 mutants. This produces a severe reduction in posterior axon projections which normally release the gonadotrophin hormones. In addition, antidiuretic hormone and oxytocin neurons are found atypically in the ventromedial hypothalamus. It seems likely, therefore, that all of the anomalies known to be associated with optic nerve hypoplasia (central nervous system as

well as endocrine problems) will be due to a deficiency of one or more chemicals important for axonal guidance during embryogenesis. (*Journal of Neuroscience* 1999;19:9900–12.)

New brainstem cochlear implants

Cochlear implants have provided a useful substitute for natural hearing for over a decade. Until now these devices have electrically stimulated the auditory nerve to enable deaf users to hear. For patients whose auditory nerves had degenerated these devices were not effective. Now it appears that a new generation of cochlear implants will be directly implanted into the brainstem thus bypassing the auditory nerve. The implant will be directly connected to the ventral cochlear nucleus. For those who hope that an ocular prosthesis can effectively be implanted into the visual cortex the technical problems that will surround the new cochlear implant procedure will obviously provide important information. (*Scientific American* 2000;82(March):27.)

Segregation distorter chromosomes have an advantage

One of the basic principles of genetics has been that each chromosome of a pair has an equal chance of being passed on to the next generation. Newer studies suggest that this principle is violated under certain circumstances. A group of chromosomes has been identified and named segregation distorters to denote that these chromosomes gain a selective advantage in the distribution of genetic information to the next generation. These types of genes have figured a way to beat the system by ending up in the vast majority of functional gametes. This gives them an enormous and unfair advantage in competing genes. The impact of such genes on a natural population was pointed out as long ago as 1957. The phase meiotic drive was used to refer to the alteration in the normal distribution of genes that occurs in this situation. This phenomenon has been documented in a wide variety of organisms including fungi plants, insects, and mammals. Recent experiments have linked segregation distorters to nuclear transport mechanisms. Underlying molecular defects that produce segregation distorters may be well defined in the near future. (*American Scientist* 2000;March:128.)

Hospital infections may arise from contaminated drapes and clothing

Physicians are all too aware that antibiotic resistant bacteria are now common contaminants throughout hospitals and clinics. A recent investigation in Cincinnati suggests that some of these potentially deadly bacteria

can live on common fabrics used for clothing, curtains, and other hospital items for up to 3 months. In this study researchers took 22 strains of bacteria and smeared them on to samples of different fabrics. What was found was that bacteria survived longest on polyester and shortest on cotton. Polyester privacy curtains, which are commonly used in surgical and clinical areas, are a potential source of bacterial contamination for long periods of time. Although it is clear that poor hand washing is the biggest problem in precipitating and spreading antibiotic resistant bacteria within the hospital setting, it is also clear that a better understanding of the dynamics of bacterial colonies on fabrics commonly used in the hospital is essential. (*Journal of Clinical Microbiology* 1999;38:724.)

Recommended reading

The Myth of the First Three Years: A New Understanding of Early Brain Development and Lifelong Learning by John T Bruer, Free Press, 1999.

The importance of environmental influence on the developing visual pathways is well known to all ophthalmologists. The ground breaking work of Hubel and Wiesel on the effects of abnormal visual environment on the developing neural visual pathways led directly to the development of early surgery for congenital cataracts. The plasticity of the developing brain is well documented throughout the central nervous system. Regrettably, this scientific information has sometimes been applied to social policy where it is inappropriate. John Bruer, an expert in the philosophy of science and a distinguished foundation executive (president of the McDonald Foundation) has now written a provocative book challenging a notion that educational policy should be established on developmental neuroscience data. As he states early in his book “What seemed to be happening was that selected pieces of rather old brain science were being used and often misinterpreted to support pre-existing views about child development and early childhood policy.” Bruer reviews the neuroscience that is often cited as justification for these policies. He discusses the work of Hubel and Wiesel although he underestimates the importance of it in ophthalmology and also cites the work of Huttenlocher on synaptic density development. He categorically states that none of these experiments justifies the kinds of early intervention programmes that have been developed in several countries. He formally concludes that much of the worry about deprivation of children in early development is misplaced, as is our notion that we are not stimulating our children enough. This is a provocative book that is relevant to educational policies both within the European educational system as well as its counterpart in the United States.



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