Records of snout to vent length, body weight, mesial-distal (anterior-posterior) tooth width, and tooth number were taken initially, after 0.92 years, and after 2.7 years. In order to measure the medial-distal tooth width, the lizards were anesthetized with ketamine HCl. One lizard was also sacrificed at each time, the skull cleaned, and detailed analysis of tooth width performed. The width of the posterior and anterior teeth on the maxilla and dentary was measured using dental calipers. The number of tooth positions was determined by taking a wax impression of the bite. A piece of dental impression wax was inserted into the mouth; the jaws were closed manually; and the teeth thus driven into the wax. When removed the number of tooth positions could be counted with the aid of a binocular dissecting microscope.

Results. When the mesial-distal tooth widths were measured, a lack of symmetry was observed. The dentary teeth were slightly larger than the corresponding maxillary teeth. However, this difference was not statistically significant. The results for the dentary teeth only are presented as their measurements were more easily obtained. The results are summarized in table 1.

Table 1

Mean body weight (g)	Mean length (cm)	No. of teeth	Tooth width (cm) Posterior	Anterior
93.7± 3.7	13.8±0.78	17	0.84±0.1	0.72±0.1
780.0± 8.5	26.0±1.10	22	1.20±0.1	0.96±0.08
1720.0±10.3	34.0±1.30	26	1.50±0.14	1.00±0.13

The teeth were observed to be wider in the posterior than in the anterior segment of the dentary. The teeth were observed to increase in width with age. In order to determine the degree of correlation between growth as measured by the mean body weights and mean body lengths and the number of teeth and tooth width, the coefficient of correlation (R) was determined between the mean body weight and mean body length and the mean tooth width and number of teeth. The results are summarized in table 2.

Table 2. Coefficient of correlation (R)

Weight vs Length	No. of teeth	Posterior width	Anterior width
R=0.96	R=0.99	R=0.98	R=0.82
Length vs No. of teeth		Posterior width	Anterior width
R=0.96		R=0.99	R=0.94

The high coefficient of correlation between the mean body weight and the number of teeth and mean posterior tooth width, as well as, the mean body length and mean posterior tooth width suggest that these 2 indicators of growth are closely related to tooth size and the number of teeth.

Discussion. Edmund[7] suggested that the tooth replacement was a mechanism to replace teeth lost through use and keep a sharp dentition. Stephens and Presch[8] analyzed tooth wear patterns in *Anolis sagrei* and its relationship to the tooth replacement phenomenon. Because the teeth showed wear, they concluded that this phenomenon enables the animal to maintain substantially sharper and functional teeth in proportion to its increasing size. They suggested a role in growth as well. Osborn[9,10] suggested that tooth replacement is related to growth of the animal. With the exception of rodents, in order to increase the size and height of the teeth, it is necessary to replace small ones with larger ones. The addition of new teeth at the back of the jaw represents growth in length of the dentition and tooth replacement within families represents growth in heigth of the dentition.

The results of this long term study on the growth of iguanas and changes in the number of teeth and size support the view that tooth replacement is closely related to growth. The teeth gradually increased in size during the period of record keeping. The observation that the posterior teeth were slightly wider than the anterior teeth, at the same time of measurement, suggests that the new teeth added at the posterior of the dentary and those being replaced as the wave of replacement sweeps forward are replacing their smaller predecessors on the growing dentary. The results collected over the long term provide actual measurements to support the view that the tooth replacement phenomenon is more than a mechanism to replace dulled teeth, it is a phenomenon closely related to the natural growth of the individual animal.

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0014-4754/83/060595-02$1.50+0.20/0

Are the pores of intramembrane particles of postsynaptic membrane transmitter-dependent channels?

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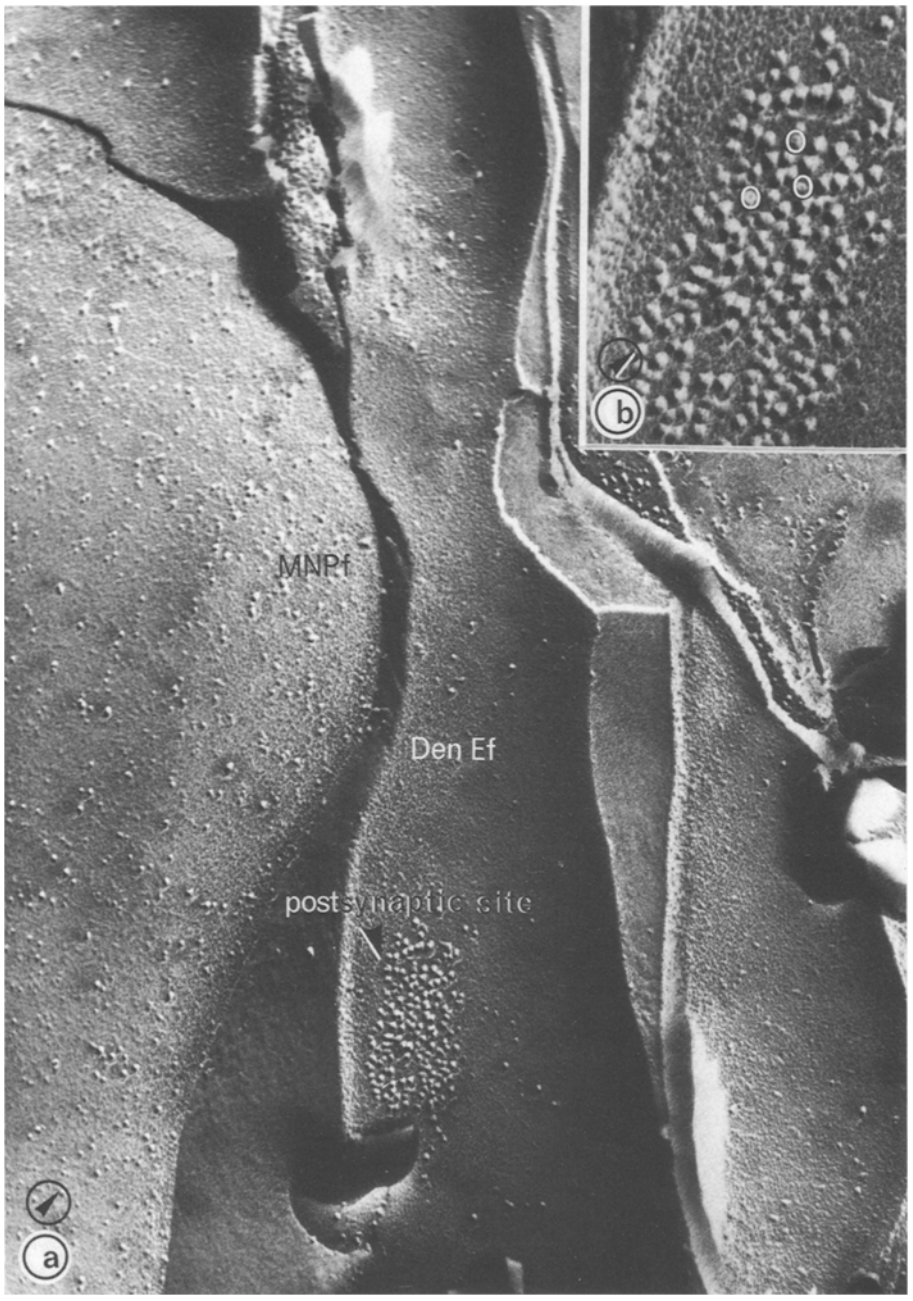
Summary. The rat neonatal cerebellar cortex has been studied using the freeze fracture technique. In the dendritic postsynaptic membrane, intramembrane particles containing an electron-dense central area have been detected. This type of area could be a platinum aggregate within a channel which, crossing the particle, may connect the postsynaptic cytoplasm with the synaptic cleft.

During development, the cerebellum has a transitory cytoarchitectural organization in which various phenomena (histogenesis, migration, cell-to-cell interactions) occur among the different cell components, leading to the charac-



a Freeze-fracture replica of a rat neonatal cerebellar cortex. The E-face of a dendrite (Den Ef) presents a postsynaptic aggregation of intramembrane particles (arrow head). MNPf, P face of the cell body of a neuroblast. ×68,000. *b* Represents a detail of a postsynaptic site (arrow) of figure a at high magnification. Three cavitated particles are encircled. ×205,000. The direction of the shadowing is indicated by the encircled arrow.

teristic 3 layers stratification of the adult cerebellar cortex. In the cerebellar cortex of a newborn rat, the following layers can be distinguished, from the surface inwards; the external granular layer, molecular layer, layer of Purkinje cells, and internal granular layer. The external granular layer contains numerous active mitotic cells which are precursors of stellate, basket, and granular cells, common glial cells, and Bergmann glial cells[1,2]. When the external granular layer completely disappears, the cerebellar cortex acquires its definitive structure; molecular layer, Purkinje cell layer, and granular layer. In order to see the cell-to-cell interactions and synaptogenesis during postnatal development in the cerebellar cortex, we studied this tissue in newborn rats, using the freeze fracture technique. In the present report, the analysis of intramembrane particles (IMPs) of postsynaptic membrane is described.

Material and methods. Young Wistar albino rats, 3–7 days of age, were used in this study. After i.p. administration of 30 mg/kg nembutal anesthesia, the animals were perfused through the left ventricle in 2 consecutive fixation steps. The composition of the fixatives was: fixative I: 1.5% formaldehyde, 1.5% glutaraldehyde in 0.1 M cacodylate buffer at pH 7.2, 2.5% PVP (mol. wt 40,000); fixative II: similar to fixative I, but with 3% formaldehyde, 3% glutaraldehyde plus 0.05% picric acid. The animals were decapitated and a hemispherical slice of cerebellar cortex 2–3 mm in diameter and 0.5–1.0 mm thick was excised with a razor blade. After rinsing in cacodylate buffer (0.1 M, pH 7.2), the tissues were cryoprotected with 5, 10, 15, 20 and then 30% (w/v) glycerol in same buffer, mounted on gold disks and quickly frozen in Freon 22 cooled with liquid nitrogen. Fracturing and shadowing were carried out at −110 °C in Balzers BAF 400 unit. Replicas were cleaned by digestion in sodium hypochlorite and washed in distilled water. Freeze fracture replicas were examined using a Phillips EM 301 electron microscope. Fracture faces were

labeled as P- or E-faces, according to Branton et al.[3].

Results and discussion. In freeze fracture, biological membranes appear as smooth surfaces (phospholipids) interrupted by globular protrusions called intramembrane particles (IMPs) (proteins)[4]. The clear identification of glial cells in freeze fracture replicas is possible beacause the IMPs profiles differ in the plasma membranes of astrocytes and oligodendrocytes[5]. The neurons present a postsynaptic membrane complex, and the dendritic membrane is readily identified as a sharply limited aggregation of 10 nm particles[6-9]. This aggregation is more conspicuous on the E-face which is generally particle-poor. The particle aggregation in the postsynaptic site of the E-face of a dendrite is shown in figure a. At high magnification, the IMPs reveal an electrondense spot, occupying the apex in some particles (fig. b). Such electrondense spots ('pores') are formed by a platinum aggregate deposited in the cavity present in the intramembrane particle during the shadowing process used in the freeze fracture technique[10]. The existence of membranous 'pores' has been hypothesized to explain the ion and hydrophile molecule diffusion occurring through the double phospholipidic layer of biological membranes[11-14].

Two types of ion movement, active and passive, can be identified across biological membranes. Active ion transport defines processes by which the ion moves 'uphill' against its electrochemical gradient by a mechanism that requires the expenditure of energy. Passive movements of ions across cellular membranes can be mediated by different types of ion channels. In same cases, these channels are large, minimally regulated and rather unselective in terms of the ions that they allow to pass. The best example of such nonselective ion channels is the nexus or gap junction[15]. These channels represent a low resistance pathway that links adjacent cells. They have recently been identified structurally[16] and are composed of units, called connexons[17], which are embedded in apposed membranes, in register and linked to each other. The connexon is a cylinder of 6 rod-shaped subunits packed to form a channel about 2 nm in diameter ('open state'). By clockwise rotation of the subunits, a 2nd structure is generated in which the subunits straighten out and slide radially, closing the channel ('closed state')[16]. It has been demonstrated that each channel of intramembrane particles in gap junction can contract gradually in response to increased concentrations of calcium. These channels are fully open at pCa 7 and closed at pCa 4.3[18]. It has recently been postulated that the plasmalemmal particles of the presynaptic terminal may be the calcium channels[14]. These channels must open in response to a change in voltage in order for the calcium current to flow. Hence each channel consists of 5 proteins each of which extends through the postsynaptic membrane. Subunits of the calcium channel have 2 possible states; in the activated state, the channel is open and when inactivated it is closed. Lliñas has postulated that in the presynaptic terminal calcium binds to a molecule called the fusion-promoting factor. In response to the binding, a certain part of the factor molecule is converted to an active state. The activated fusion-promoting factor causes synaptic vesicles to fuse with the presynaptic membrane so that they release their content of neurotransmitter. Then the activated factor returns to an inactive state. Meanwhile the neurotransmitter molecules are opening channels in the postsynaptic membrane so that ionic current flows and membranes become depolarized[14]. These hypothetical postsynaptic channels may be associated with the postsynaptic membrane particles (transmitter-dependent channels)[14].

On the basis of the structural similarity between the cavity particles of gap junctions[16,17,19] and isolated particles of different cells[10] and those observed in the dendrite postsynaptic membrane of rat neonatal cerebellar cortex, it is postulated that the latter are provided with a channel linking the postsynaptic cytoplasm with the synaptic cleft; however, its significance remains to be clarified.

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0014-4754/83/060596-03$1.50 + 0.20/0

Acetylcholinesterase localization at synapses in chick embryo ciliary ganglion

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Summary. The cytochemical localization of acetylcholinesterase (AChE) at calyciform synapses of the chick ciliary ganglion during embryonic development has been investigated. AChE activity is present at the surface membrane of newly formed calyciform synapses and closely follows the progressive enlargement of the synaptic area. The occurrence of a retrograde iris-dependent influence on ganglionic AChE is considered. AChE seems to be a suitable marker for synaptic maturation.

It is known that cholinergic activities undergo characteristic changes during embryonic life in the chick ciliary ganglion (CG)[1], an autonomic parasympathetic ganglion with a typical cholinergic transmission[2]. The calyciform nerve ending is a giant presynaptic terminal which surrounds large surface areas of the ciliary neurons, one of the 2 cell