

gangliar sympathetic⁵ rather than peripheral motor fibres⁶, the ChEI concentrated at the synaptic level being extensively involved as indicated by the high drops in activity.

The dependence of cortico-cerebellar ChEI activity from the integrity of afferent fibres closely agrees with histochemical data of a selective distribution of the enzyme in the cortico-cerebellar layers containing afferent terminals³⁻⁴. Both facts fit in with the above-mentioned information to support a possible cholinergic mechanism of some cerebellar afferent systems.

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Riassunto

Lesioni unilaterali nell'ambito dei peduncoli cerebellari sono seguite, nel ratto, da una caduta dell'attività colinesterasica vera del cervelletto, che raggiunge i valori massimi del 60% nella metà ipsilaterale e del 40% in quella controlaterale nel caso di sezione totale dei tre peduncoli. In nessun caso l'attività della pseudo-colinesterasi è risultata significativamente modificata.

⁵ C. H. SAWYER and W. H. HOLLINSHEAD, *J. Neurophysiol.* 8, 137 (1945).

⁶ R. COUTEAUX, *Int. Rev. Cytol.* 4, 335 (1955).

Effects of Midline Cerebellar Splitting and of Lesions in Cerebral Cortex on Cerebellum Cholinesterase Activity, in the Albino Rat

Chronic unilateral section of rat cerebellar peduncles has been shown¹ to reduce true cholinesterase activity (ChEI) in both homolateral and controlateral halves of cerebellum, drop values ranging around 60% and 40% respectively. Results have been referred to the degeneration of afferent fibres ending in cerebellar cortex – where ChEI is highly concentrated²⁻⁵ –, a partial intracerebellar crossing⁶ possibly accounting for the controlateral effect.

Partial or total mid-sagittal division of cerebellum – involving only the fibres crossing the midline – has now proved to give, in the two halves of cerebellum, balanced drops of ChEI activity, approaching, when division is complete, the fall value previously obtained in the controlateral side of cerebellum. As in the case of lesions of cerebellar peduncles, no significant variation was ever found in pseudocholinesterase (ChEII) activity. Results, schematically represented in Table I, refer then only to ChEI, and are in each case the mean of the values obtained on the two halves of cerebellum, which never differed more than 3%.

¹ L. SPERTI and S. SPERTI, *Exper.* 15, 441 (1959).

² A. S. V. BURGEN and L. M. CHIPMAN, *J. Physiol.* 114, 296 (1951).




³ S. C. SHEN, P. GREENFIELD, and E. J. BOELL, *J. comp. Neurol.* 102, 717 (1955).

⁴ L. SPERTI, S. SPERTI, and P. ZATTI, *Arch. ital. Biol. sper.*, in press.

⁵ G. B. KOELLE, *J. comp. Neurol.* 100, 211 (1954).

⁶ J. JANSEN and A. BRODAL, *Aspect of Cerebellar Anatomy* (J. Grundt Tanum Forlag, Oslo 1954), p. 83.

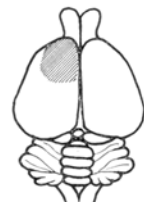
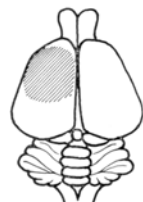
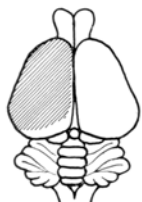
Table I
ChEI activity of rat cerebellum following mid-sagittal division

		
QEX 879 QCO 985	-11% QEX 918 QCO 1080	-33% QEX 653 QCO 976

Drawings outline the extension of the lesion

QEX, QCO = ChEI activity of the operated animals and of the controls, expressed as $\mu\text{l CO}_2/\text{g}$ wet weight of tissue/h, with acetyl- β -methylcholine as substrate. Per cent falls in activity are also reported. In each experiment, the control was of the same litter as the operated animal

Table II
ChEI activity of rat cerebellum following more or less extensive ablations of cerebral cortex

		
QEX 1120(R) 0% 1145(L) +2%	QEX 1010(R) -1% 979(L) -4%	QEX 1150(R) +1% 1195(L) +5%
QCO 1125	QCO 1018	QCO 1135

Drawings outline the cortical lesion

QEX, QCO = as defined in Table I. R and L between brackets indicate the right and left half of cerebellum

The drop in ChEI activity is only the consequence of the degeneration of afferent terminals in cerebellar cortex. Deafferentation of pontine neurons, relaying impulses from cerebral cortex, no longer reproduces the effects of section of middle cerebellar peduncle, containing pontocerebellar axons. Table II schematically represents the results of more or less extensive ablations of cerebral cortex: no variation in either ChEII or ChEI activity has ever been found in the two halves of cerebellum.

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Riassunto

La divisione sagittale mediana del cervelletto è seguita, nel ratto, da una eguale diminuzione della attività colinesterasica vera nelle due metà del cervelletto, che raggiunge, nei casi di divisione completa, valori che si avvicinano a quelli osservati nella metà controlaterale per sezione totale, unilaterale, dei peduncoli.

Lesioni della corteccia cerebrale, anche se estese, non modificano l'attività colinesterasica vera del cervelletto.

In nessun caso vennero osservate modificazioni dell'attività pseudocolinesterasica.