Corpus Callosum

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The corpus callosum is a broad transverse bundle of myelinated nerve fibres connecting the two cerebral hemispheres. Curiously, it is absent from marsupials and in monotremes (mammals that lay eggs instead of giving birth to live young and who have a common cloaca). The corpus callosum is made up of 200–250 million axons.

The term's origins are in Latin: *corpus*, body, + *callosum*, neuter of callosus, hard-skinned, callous, from *callum* (callus), hardened skin. The adjective is callosal.

But when did the name callus find application in the largest white matter structure in the mammalian brain?

The first recorded instance of the term in English (*Oxford English Dictionary*) is when Edward Phillips in *The New World of English Words: or, A General Dictionary* [1] stated:

‘Corpus Callosum (in Anatomy) is the upper Part, or Covering of a Space made by the joyning together of the right and left Side of the inward Substance of the Brain.’

Historically it was recognised by Andreas Vesalius (1514–1564), who in 1543, translated from Latin, wrote:

‘There is a part [whose] external surface is gleaming white and harder than the substance on the remaining surface of the brain. It was for this reason that the ancient Greeks called this part “tyloeides” [“callosus” in Latin] and, following their example, in my discourse I have always referred to this part as the corpus callosum. If you

look at the right and left brain ... and also if you compare the front and rear, the corpus callosum is observed to be in the middle of the brain; ... Indeed, it relates the right side of the cerebrum to the left; then it produces and supports the septum of the right and left ventricles; finally, through that septum it supports and props the [fornix] so that it will not collapse and, to the great detriment of all the functions of the cerebrum, crush the cavity common to the two [lateral] ventricles of the cerebrum’ (p. 597) [2].

It appeared later in zoology: in Richard Owens’s *Lectures on the Comparative Anatomy of Invertebrate and Vertebrate Animals*, 1868, which described ‘its [corpus callosum] hind part is embraced by the “callosal convolution”’.

The posterior portion of the corpus callosum is called the splenium (Greek *splenion* for bandage or compress); the anterior is called the genu (Latin *genu*, a knee); between the two is the body (*corpus*). The most anterior part is the rostrum (Latin *rostrum*, a beak).

Agenesis of the corpus callosum [3] is a rare, complete or partial absence of the corpus callosum. Associated disorders include: the Dandy-Walker syndrome, Aicardi syndrome, hydrocephalus, midline lipoma of corpus callosum, Arnold-Chiari malformation, grey matter heterotopias, and trisomies 18, 13 and 8. Callosal section is still used for selected cases of intractable epilepsy [4].

Perhaps its greatest interest is reflected in the classical experiments of Roger Wolcott Sperry (1913–1994), who was awarded the Nobel prize in 1981 ‘for his discoveries concerning the functional specialization of the cerebral hemispheres’, and Michael Gazzaniga, who investigated patients subjected to surgical division of the corpus cal-

losum. These so-called ‘split-brain experiments’ established the role of the corpus callosum in inter-hemispheric information transfer [5] and established the roles of the non-dominant hemisphere in aspects of language and cognition.

References

- 1 Phillips E, cited in Kersey J (ed): The New World of English Words: or, A General Dictionary, ed 6, 1706.
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- 3 Kendall BE: Dysgenesis of the corpus callosum. *Neuroradiology* 1983;25:239–256.
- 4 Bogen IE, Sperry RW, Vogel PJ: Commissural section and propagation of seizures; in Jasper HH, Ward AA, Pope A (eds): *Basic Mechanisms of the Epilepsies*. Boston, Little, Brown & Co, 1969.
- 5 Zaidel E, Iacoboni M: *The Parallel Brain. The Cognitive Neuroscience of the Corpus Callosum*. Cambridge, The MIT Press, 2003.