4t Premi Turró, Edició 2018
(publicacions dels anys 1992-93)

Societat Catalana de BIOLOGIA

L'edició 2018 del Premi Ramon Turró va ser atorgada al **Dr. Jesús Pujol**, de l'Hospital del Mar, com a autor principal de l'article

Pujol, J.; Vendrell, P.; Junqué, C.; Martí-Vilalta, J. L.; Capdevila, A. (1993). «When does human brain development end? Evidence of corpus callosum growth up to adulthood». *Annals of Neurology*, 34, p. 71-75.

En els vint-i-cinc anys posteriors a la seva publicació fou citat 239 vegades.

When Does Human Brain Development End? Evidence of Corpus Callosum Growth up to Adulthood

Jesús Pujol, MD,* Pere Vendrell, PhD,† Carme Junqué, PhD,‡ Josep L. Martí-Vilalta, MD,* and Antoni Capdevila, MD‡

To locate structural changes in the brain accounting for the increasing effectiveness in cognition and skills that occurs at the final stage of behavioral development, we attempted to determine the age at which the corpus callosum completes its active growth period. We assessed the growth rate of the corpus callosum by measuring its area twice on midsagittal magnetic resonance imaging scans separated by a 2-year interval, in a series of 90 subjects with a wide range of ages. We observed an increase in the size of the corpus callosum as long as human mentation expands, up to the middle 20s. Clinical and experimental data about the corpus callosum, together with the present findings, suggest that the corpus callosum is part of the highest order–latest maturing neural network of the brain.

Pujol J, Vendrell P, Junque C, Martí-Vilalta JL, Capdevila A. When does human brain development end? Evidence of corpus callosum growth up to adulthood. Ann Neurol 1993;34:71–75

All the basic elements required for thinking are acquired by the developing brain by the early teenage years. Nevertheless, in later years young adults improve the speed, capacity, and ability of their mental functions beyond the age at which somatic growth has already stopped [1–3]. The corpus callosum, the largest tract in the human brain, interconnects all the major subdivisions of the cerebral cortex including a great proportion of fibers from high-level associative areas [4]. The demonstration in vivo of late growth in bundles connecting these associative areas may partly explain what happens at the final stage of behavioral maturation. The discrete appearance of the corpus callosum on midsagittal magnetic resonance images (MRIs) [5–7] suggested that with a fine method of measurement, it could be feasible to approximate in vivo the age at which the corpus callosum completes its growth period. Here we measured the area of the corpus callosum twice in the same individuals on MRI separated by a 2-year interval and determined the relationship of the corpus callosum growth with age.

Materials and Methods

This retrospective study consisted of both cross-sectional and longitudinal designs in which we evaluated MRIs from individuals who had been examined twice. We measured the midsagittal area of the corpus callosum in 90 subjects with a wide age range, on scans taken about 2 years apart (23.59 ± 6.5 months [± standard deviation]) and determined the growth rate of the corpus callosum for definite age groups.

Selection criteria were (A) absence of any known disease involving the cerebral hemispheres either structurally or functionally, (B) normal appearance of the cerebrum on both MRIs, (C) time between the scans more than 12 and less than 36 months, and (D) good-quality T1-weighted midsagittal images and adequate subject position in each examination. The study was performed in two phases. First we selected half the MRIs (n = 45) to determine the final point of the corpus callosum growth period within a large range, and then we selected the rest of the subjects within this estimated age range to obtain accurate results. The entire sample is treated as one, for ease of understanding.

The age of the subjects at the time of the initial MRI ranged from 11 to 61 years, with a mean of 29.44 ± 11.8 years. Sixty-one were women and 29 were men. We included 20 volunteers after they had provided informed consent. Eleven of them were participants as normal volunteers in other investigations and served as subjects in this study. Nine were volunteers required to undergo a second MRI (the first scan was for clinical purposes). The rest of the series comprised patients who underwent two MRIs for medical reasons. Clinical imaging studies of the 70 patients and 9 volunteers (their first scan) were indicated for the following reasons: (A) microprolactinoma under treatment with bromocriptine and documented normal status of the remainder hypophysial hormones (n = 39); (B) headache or migraine (n = 18); (C) nonprogressive lesions of the skull, posterior fossa, or craniovertebral junction (n = 12); (D) isolated non-

From the *Department of Neurology, Santa Creu i Sant Pau Hospital, Autonomous University of Barcelona, †Department of Psychiatry and Clinical Psychobiology, University of Barcelona; and ‡Centre Mèdic de Ressonància Magnètica de Barcelona, Catalonia, Spain.

Received Sep 25, 1992, and in revised form Jan 19 and Feb 12, 1993. Accepted for publication Feb 25, 1993.

Address correspondence to Dr Pujol, Department of Neurology, Santa Creu i Sant Pau Hospital, S.A.M. Claret 167, 08025 Barcelona, Catalonia, Spain.

Societat Catalana de BIOLOGIA

Els 3 articles més citats, publicats als anys 1992-93 i que complien els requisits del premi Ramon Turró, van ser:

Pujol, J.; Vendrell, P.; Junqué, C.; Martí-Vilalta, J. L.; Capdevila, A. (1993) When does human brain development end? Evidence of corpus callosum growth up to adulthood Annals of Neurology 34; 71-75 Departament de Neurologia, Hospital de la Santa Creu i Sant Pau, Universitat Autònoma de Barcelona	**239 cites**
Bel, N, A; Artigas, F (1992) Fluvoxamine preferentially increases extracellular 5-hydroxytryptamine in the raphe nuclei: an in vivo microdialysis study European Journal of Pharmacology 229; 101-103 Department of Neurochemistry, CSIC, Barcelona	**232 cites**
Pedro-Botet, J.; Sentí, M.; Nogués, X.; Rubiés-Prat, J.; Roquer, J.; D'Olhaberriague, L.; Olivé, J. (1992) Lipoprotein and apolipoprotein profile in men with ischemic stroke. Role of lipoprotein(a), triglyceride-rich lipoproteins, and apolipoprotein E polymorphism. Stroke 23; 1556-1562 Departament de Medicina, Hospital del Mar, Barcelona, Espanya.	**230 cites**

L'entrega del 4t Premi Ramon Turró al Dr. Jesús Pujol es va fer durant el XI Simposi de Neurobiologia Experimental de la Societat Catalana de Biologia (12-13 novembre 2018).

El Dr. Jesús Pujol imparteix la conferència d'acceptació del 4t Premi Ramon Turró durant XI Simposi de Neurobiologia Experimental de la Societat Catalana de Biologia.

neuro SCB

L.4. QUAN FINALITZA EL DESENVOLUPAMENT DEL CERVELL HUMÀ ?

Pujol J

Unitat de Recerca en Neuroimatge, Hospital del Mar, Barcelona

El desenvolupament del cervell humà equival al desenvolupament de la persona, un fenomen complex i llarg que sabem quan comença, però no massa quan acaba. Tradicionalment, la formació del cervell es donava per acabada durant l'adolescència, quan el cos deixa de créixer i on els trets bàsics de la personalitat estan establerts. No obstant, a l'adolescent li queda encara bastant per polir, pel que fa al control de la conducta i les capacitats intel·lectuals. Sospitant que el desenvolupament del cervell es deuria prolongar fins a l'edat adulta, vàrem mesurar canvis de volum al llarg del temps en diverses estructures cerebrals. Els resultats van demostrar que el cos callós augmentava de volum almenys fins els 25 anys. El cos callós és el feix de connexions cerebrals més gran, que comunica els dos hemisferis i fa possible les activitats intel·lectuals més complexes. Així doncs, vàrem descobrir que una estructura representativa de la cognició més elaborada creix fins a l'edat adulta, cosa que avui pot resultar òbvia, però aleshores la idea era bastant revolucionària. L'augment de volum del cos callós correspon a un augment de la mielina dels axons i fa que la transmissió de les senyals entre neurones sigui més ràpida. Posteriorment, en altres estudis, hem fet servir la mielinització com a mesura de la maduració cerebral i hem aprés moltes coses. Per exemple, hem vist com maduren les àrees del llenguatge en nens normals des dels zero fins als tres anys. També hem establert la correspondència entre el retard en la mielinització i el retard mental. Ara sospitem que la ment criminal del psicòpata pot parcialment ser conseqüència d'una mielinització accelerada associada a estrès vital en les primeres fases de la vida. El desenvolupament del cervell humà és un fenomen fascinant i avui disposem de bones eines per estudiar-lo.

Resum de la conferència del Dr. Pujol d'acceptació del 4t Premi Ramon Turró

El Dr. Jesús Pujol (esquerra), rep el 4t Premi Ramon Turró de mans del Dr. Carles Saura, coordinador de la secció de Neurobiologia Experimental de la Societat Catalana de Biologia.