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► **To cite this version:**

Anna Maria Kubicka, Anne-Laure Bernat, Wioletta Nowaczewska, Antoine Balzeau. Excessive asymmetry of the human endocast in the context of evolutionary changes in hominids. *Bulletins et Mémoires de la Société d'anthropologie de Paris*, 2023, 35 ((s)), 10.4000/bmsap.11227 . hal-04125473

HAL Id: hal-04125473

<https://hal.science/hal-04125473>

Submitted on 5 Jul 2024

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Excessive asymmetry of the human endocranium in the context of evolutionary changes in hominids

Accroissement de l'asymétrie de l'endocrâne humain dans le contexte des changements évolutifs chez les hominidés

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Édition électronique

URL : <https://journals.openedition.org/bmsap/11227>

DOI : [10.4000/bmsap.11227](https://doi.org/10.4000/bmsap.11227)

ISSN : 1777-5469

Éditeur

Société d'Anthropologie de Paris

Référence électronique

Anna Maria Kubicka, Anne-Laure Bernat, Wioletta Nowaczewska et Antoine Balzeau, « Excessive asymmetry of the human endocranium in the context of evolutionary changes in hominids », *Bulletins et mémoires de la Société d'Anthropologie de Paris* [En ligne], 35(S) | 2023, mis en ligne le 14 janvier 2023, consulté le 26 décembre 2023. URL : <http://journals.openedition.org/bmsap/11227> ; DOI : <https://doi.org/10.4000/bmsap.11227>

Ce document a été généré automatiquement le 26 décembre 2023.



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Excessive asymmetry of the human endocast in the context of evolutionary changes in hominids

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- 1 Human brain (especially the posterior part of the perisylvian region) reveals higher level of asymmetry than the brain in non-human primates and is likely to favour the appearance of specialized cognitive abilities in humans. Nevertheless, the factors leading to the appearance of pronounced brain asymmetry in the genus *Homo* and different brain structures among hominids are still unclear. The new END-ASYM project will investigate whether the causes of excessive brain asymmetry in the genus *Homo* can be found in the changes in hemispheric blood flow velocity. This assumption is based on the fact that oxygenated blood transmitted by the blood vessels supports aerobic metabolic demands of the brain. In other words, there is a functional link between the size of the arteries and the amount of blood flow rate in hemispheres. That is why, it is worth investigating whether the pronounced endocast asymmetry in humans may result from differences in the blood flow rate between brain hemispheres.
- 2 To investigate the above assumption, macroevolutionary research are carried out. The material consists of about 1,600 CT skull scans of non-human primates, all known hominid fossils from Africa and Asia and modern human groups for which the cranial vault and base of the skull are preserved. Moreover, the Moyamoya patients are also investigated to assess the real impact of cerebral blood supply disorders on the asymmetry of the endocast and brain. To achieve the project goals, a combination of measurements with modern methods (geometric morphometrics) are used. Currently,

the research is still ongoing therefore only the developed methodological approach (3D endocranium reconstruction, geometric morphometrics, method of blood flow calculation) and the first results will be presented.

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