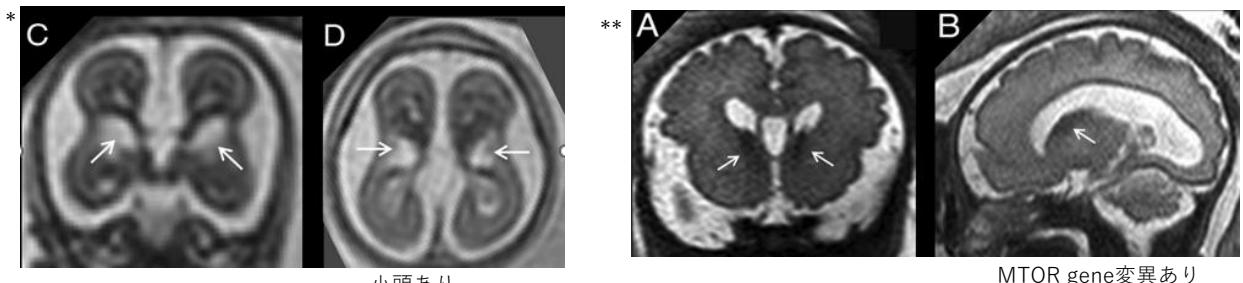


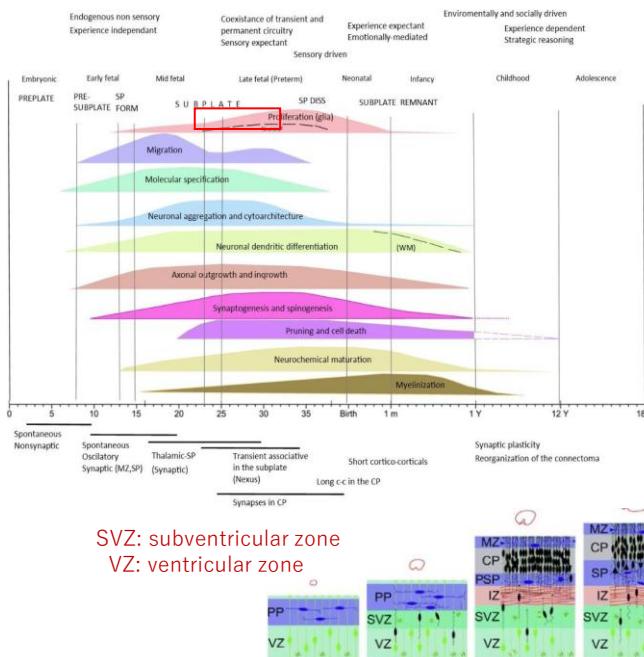
## 胎生期・早産児側脳室隣接部病変

- **Germinal matrix** → germinal matrix hemorrhage, germinolysis (pseudocyst)
  - **Ganglionic eminence** → cavitations in the GE\*, increased volume of the GE\*\*
  - **Subventricular zone, ventricular zone**
  - Subependymal area → subependymal hemorrhage, subependymal germinolysis



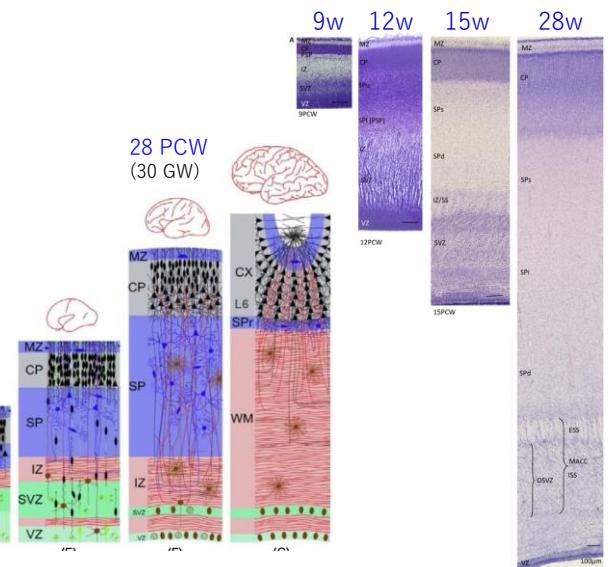
Scarabello M, et al. Ganglionic Eminence Anomalies and Coexisting Cerebral Developmental Anomalies on Fetal MR Imaging: Multicenter-Based Review of 60 Cases. AJNR Am J Neuroradiol 2021;42:1151-1156.

1



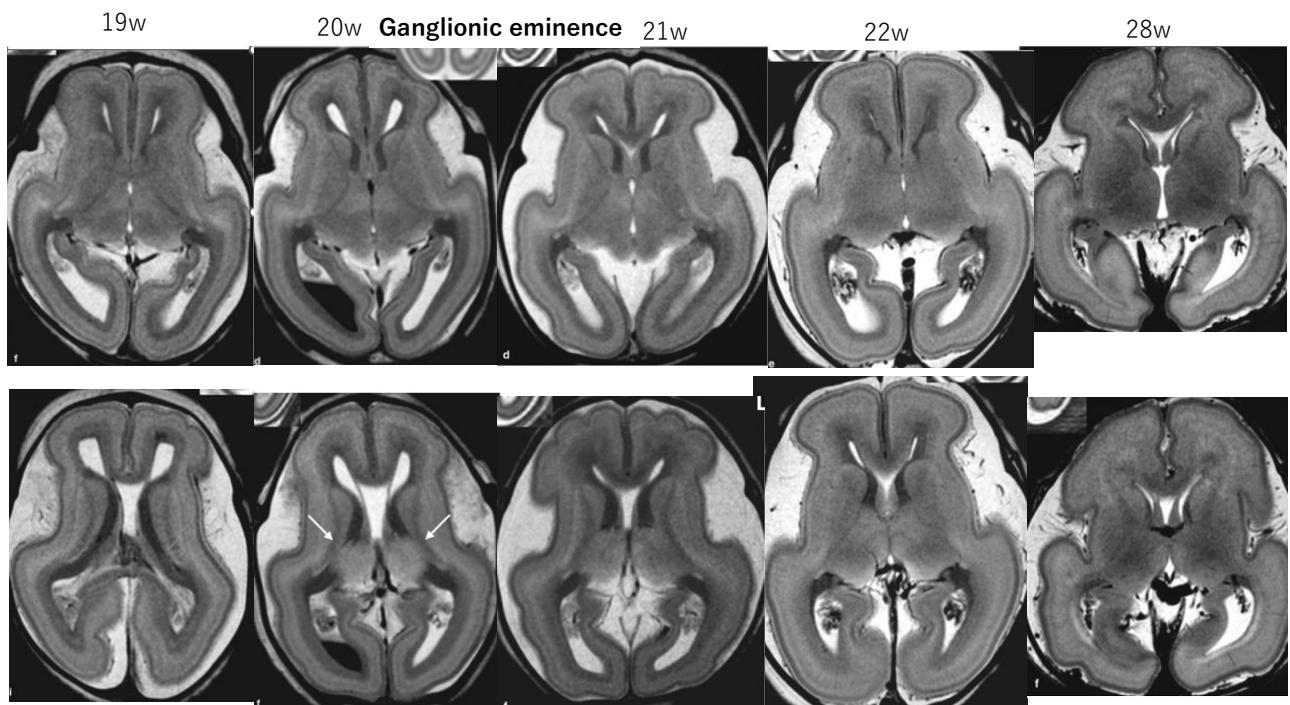
- 34wからsubplateはdissolution消退
- Synapse-rich subplate compartment (SPC)はsubplate remnantとして残る

c-c: cytoarchitectonic compartment

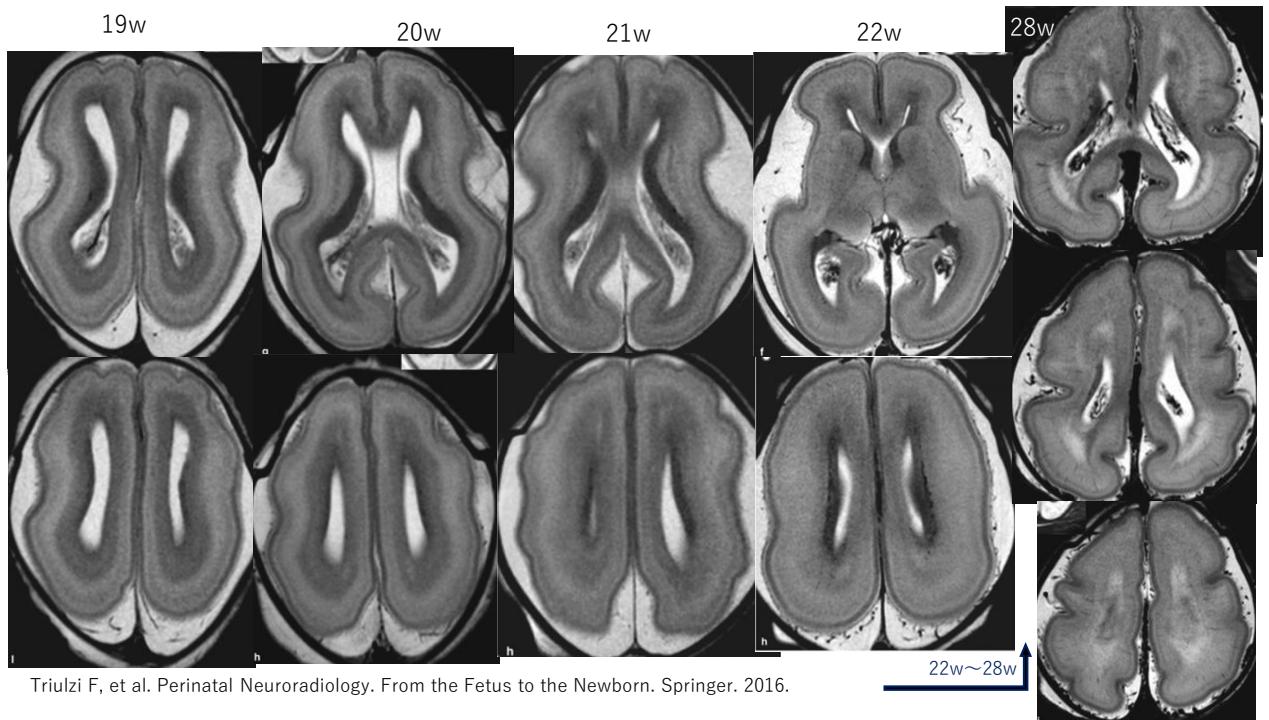


Kostović I et al. Sublaminar organization of the human subplate: developmental changes in the distribution of neurons, glia, growing axons and extracellular matrix. *J Anat.* 2019;235:481–506.

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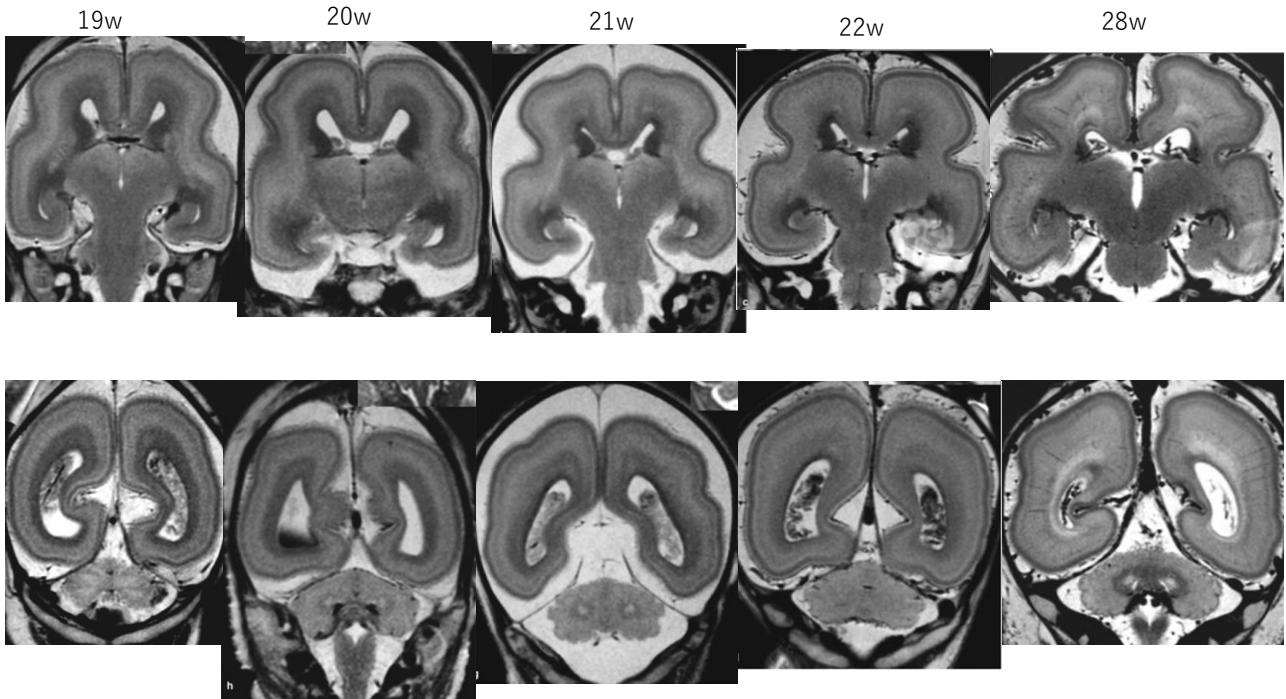
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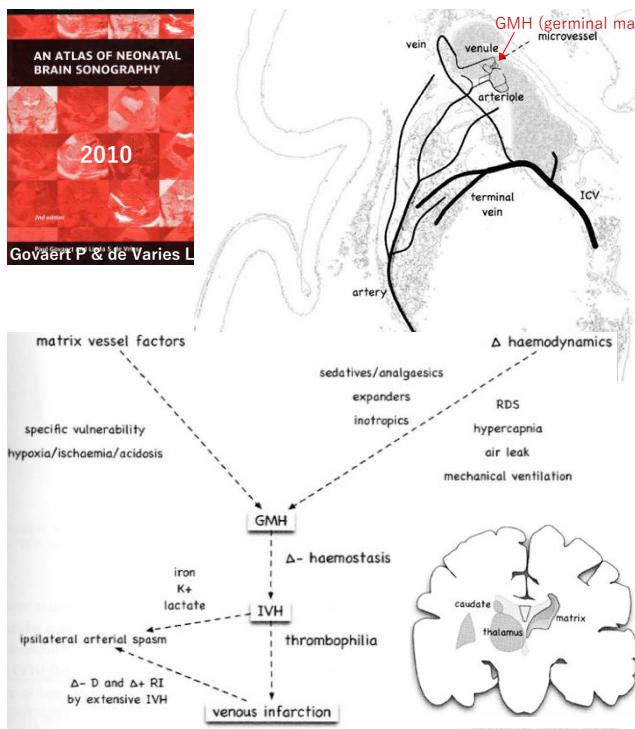
Triulzi F, et al. Perinatal Neuroradiology. From the Fetus to the Newborn. Springer. 2016.

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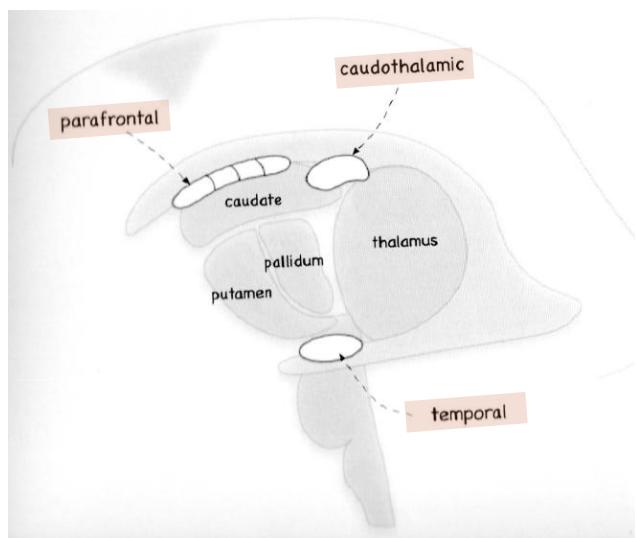
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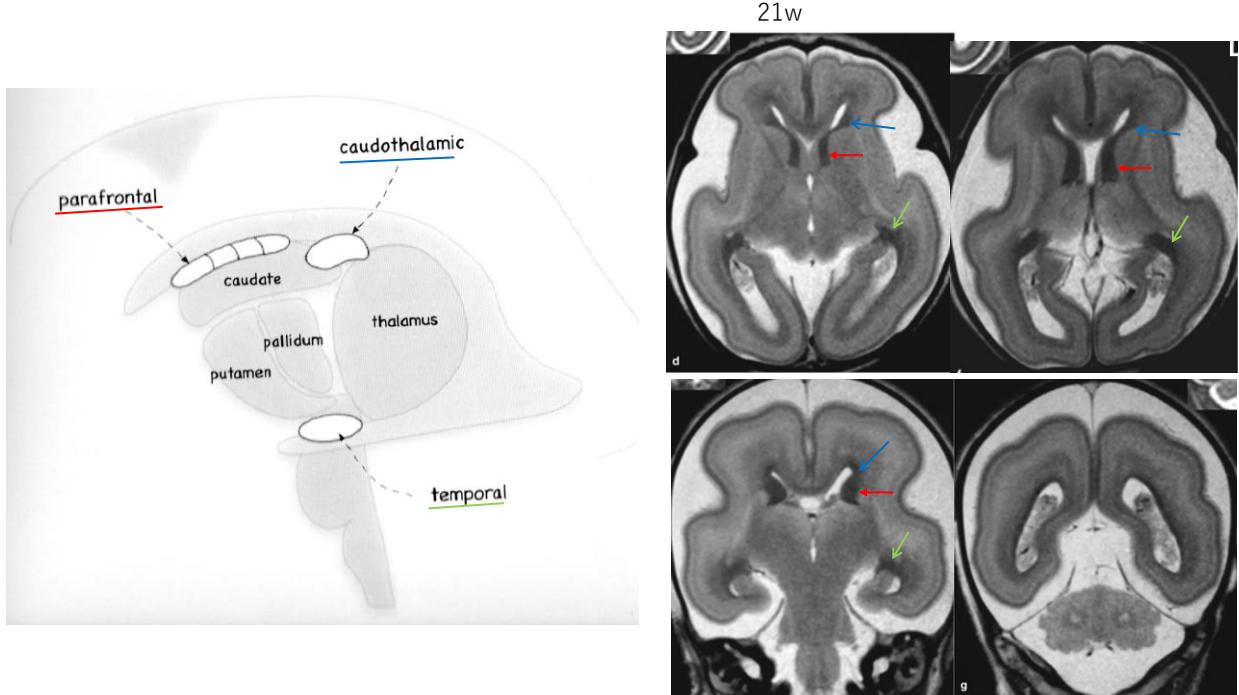
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Three variants of cystic **germinolysis** of antenatal onset



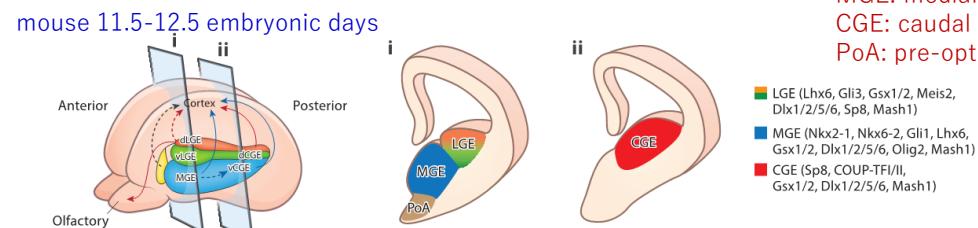
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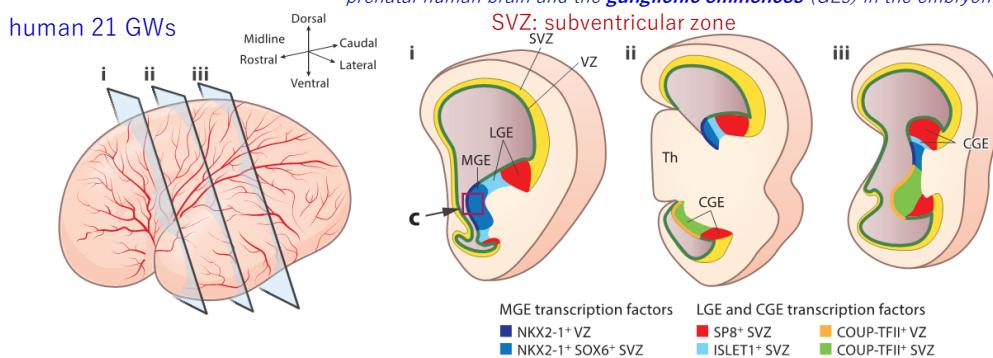
7

Chen J, Choi JJ, Lin PY, Huang EJ. Pathogenesis of Germinal Matrix Hemorrhage: Insights from Single-Cell Transcriptomics. *Annu Rev Pathol* 2025;20:221-243.

LGE: lateral ganglionic eminence  
MGE: medial ganglionic eminence  
CGE: caudal ganglionic eminence  
PoA: pre-optic area



The similarities in the organization and gene expression profiles between the **germinal matrix** in the prenatal human brain and the **ganglionic eminences** (GEs) in the embryonic mouse brain.



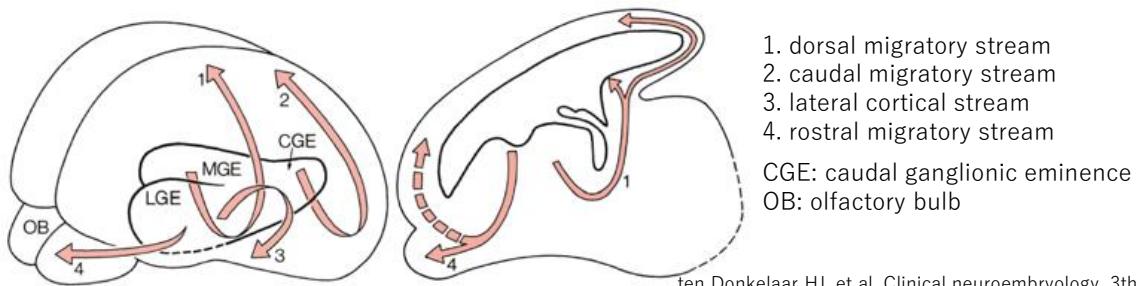
SVZとGEは連続  
VZは?

8

4

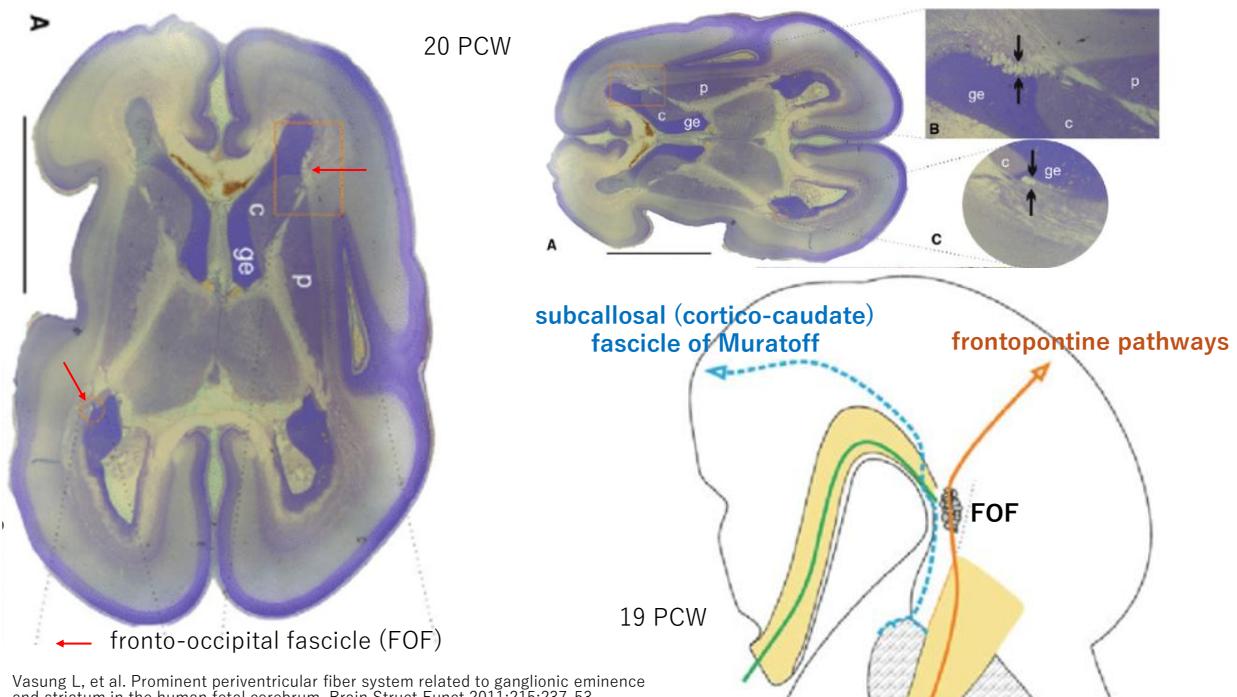
- Germinal matricesは初めはventricular zoneのみからなっていたが、より側方にsubventricular zoneができる
  - これらのgerminal zonesは、その場所、生成されるneuronの種別、neuronの最終到達部位によって4分される
- 1) medial ganglionic eminence  
第III脳室近傍にあり。GABAergic neuronを生成し、大脳皮質・海馬・淡蒼球のinterneuronとなる
  - 2) lateral ganglionic eminence  
第III脳室近傍にあり。GABAergic neuronを生成し、striatal projection neuron、olfactory interneuron、一部のthalamic interneuronとなる
  - 3) preoptic area  
第III脳室底面にあり。GABAergic neuronを生成し、preoptic area・扁桃体・淡蒼球後部・大脳皮質細胞となる
  - 4) dorsal neocortical germinal zone  
側脳室壁にあり。glutamatergic neuronを生成し、新皮質細胞となる

Major routes of tangential migration in the murine forebrain



ten Donkelaar HJ, et al. Clinical neuroembryology. 3<sup>rd</sup> ed. 2023.

9



Vasung L, et al. Prominent periventricular fiber system related to ganglionic eminence and striatum in the human fetal cerebrum. Brain Struct Funct 2011;215:237-53.

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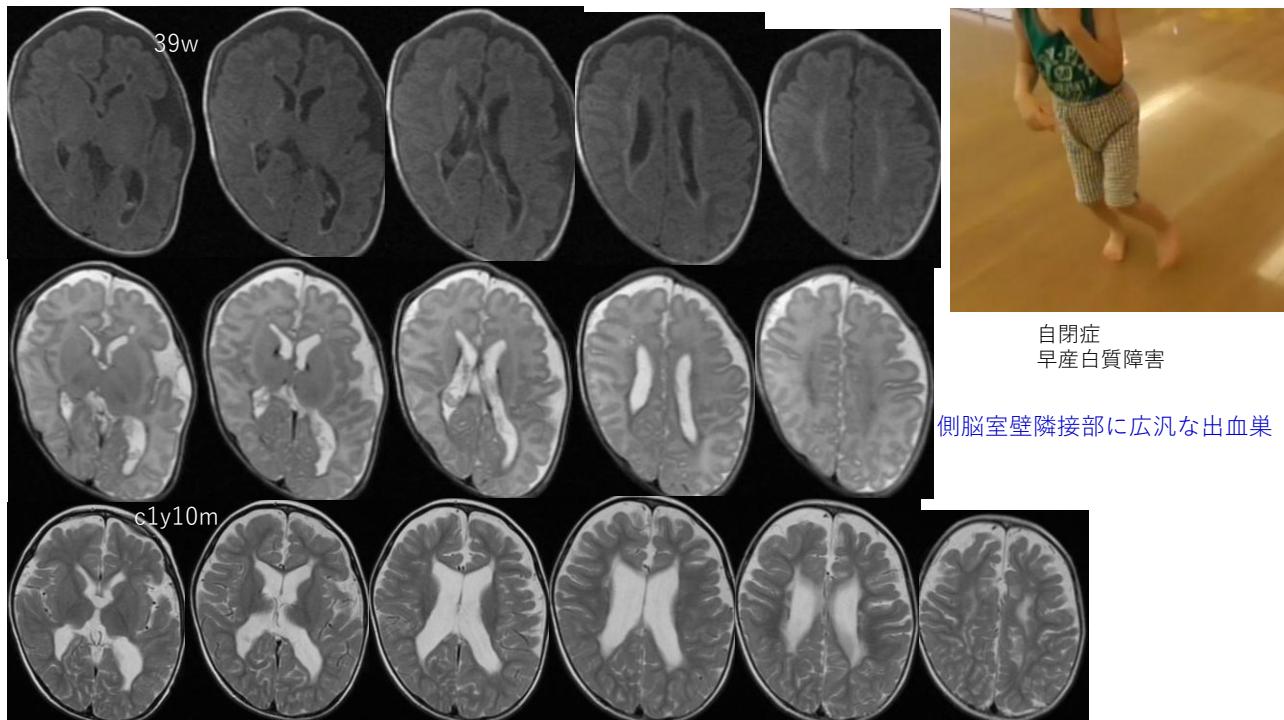
# Application of Medial Ganglionic Eminence Cell Transplantation in Diseases Associated With Interneuron Disorders

Danping Li, Qiongfang Wu and Xiaohua Han\*

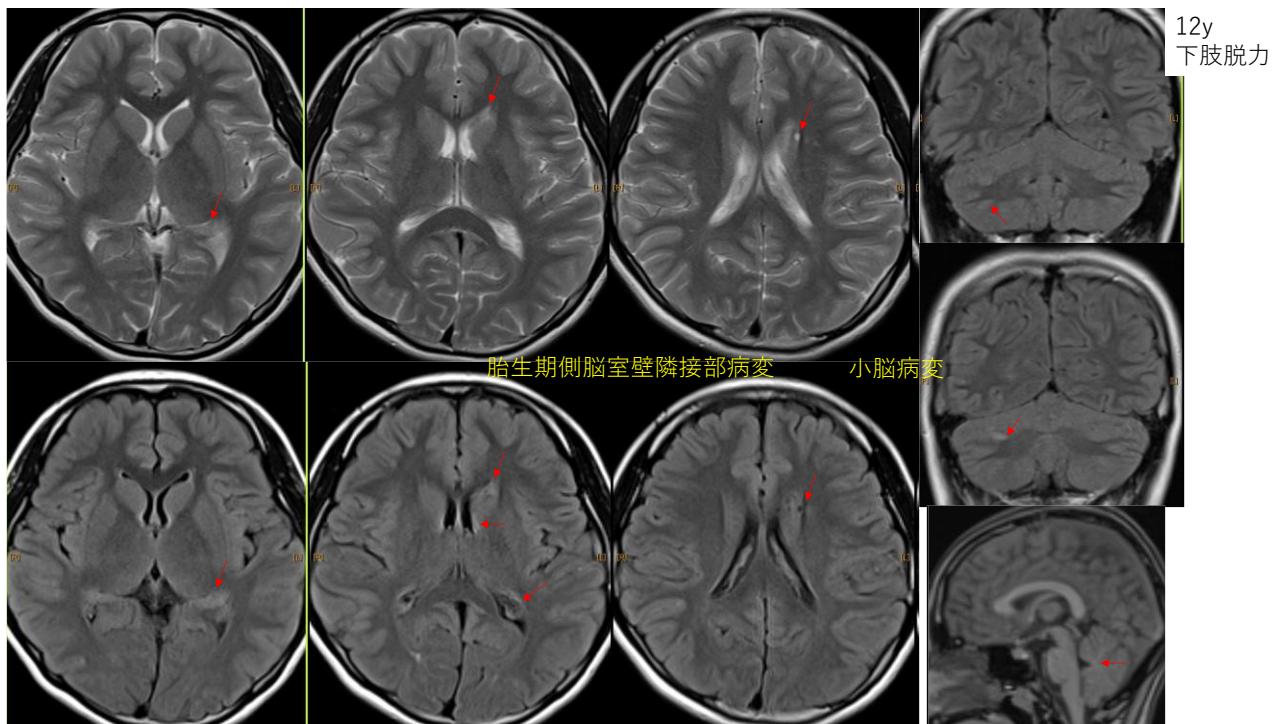
Department of Rehabilitation Medicine, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

Excitatory projection neurons and inhibitory interneurons primarily accomplish the neural activity of the cerebral cortex, and an imbalance of excitatory-inhibitory neural networks may lead to neuropsychiatric diseases. Gamma-aminobutyric acid (GABA)ergic interneurons mediate inhibition, and the embryonic medial ganglionic eminence (MGE) is a source of GABAergic interneurons. After transplantation, MGE cells migrate to different brain regions, differentiate into multiple subtypes of GABAergic interneurons, integrate into host neural circuits, enhance synaptic inhibition, and have tremendous application value in diseases associated with interneuron disorders. In the current review, we describe the fate of MGE cells derived into specific interneurons and the related diseases caused by interneuron loss or dysfunction and explore the potential of MGE cell transplantation as a cell-based therapy for a variety of interneuron disorder-related diseases, such as epilepsy, schizophrenia, autism spectrum disorder, and Alzheimer's disease.

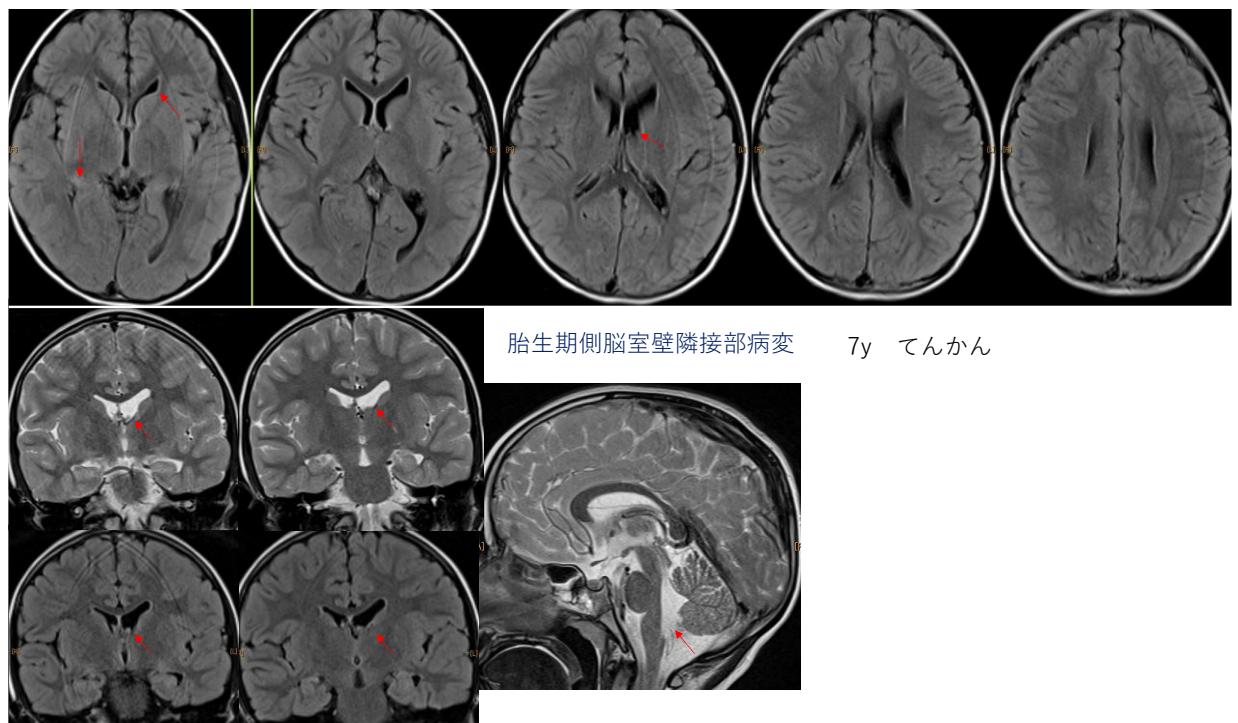
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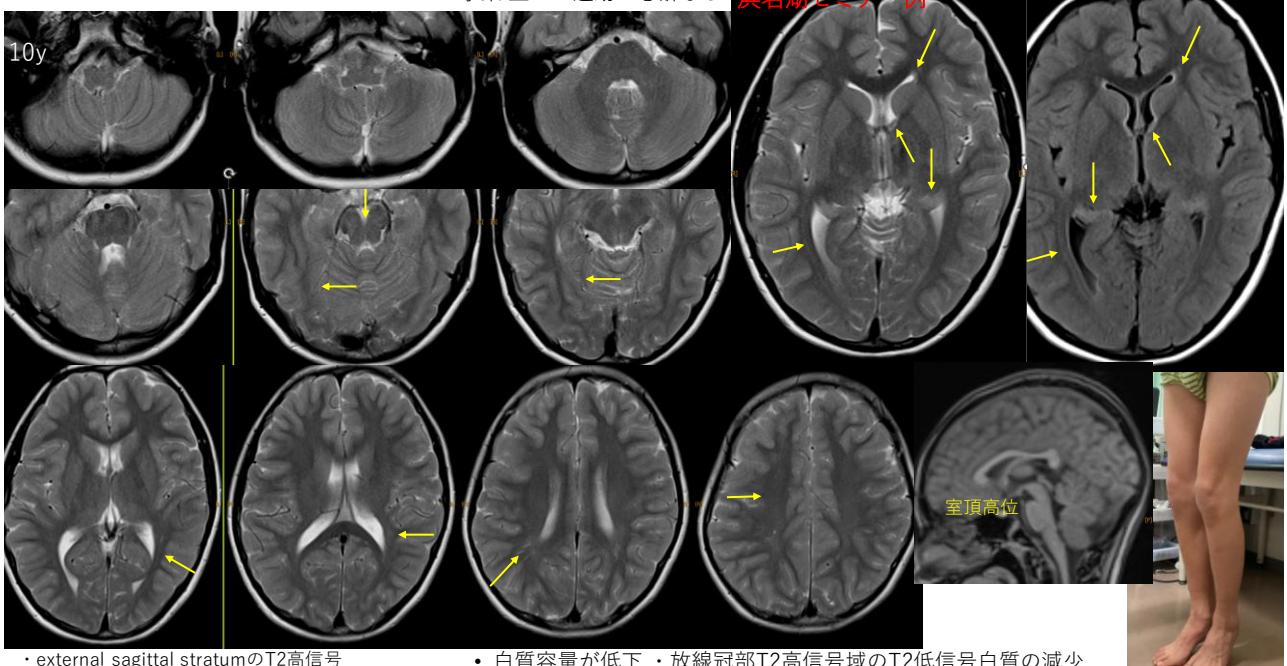
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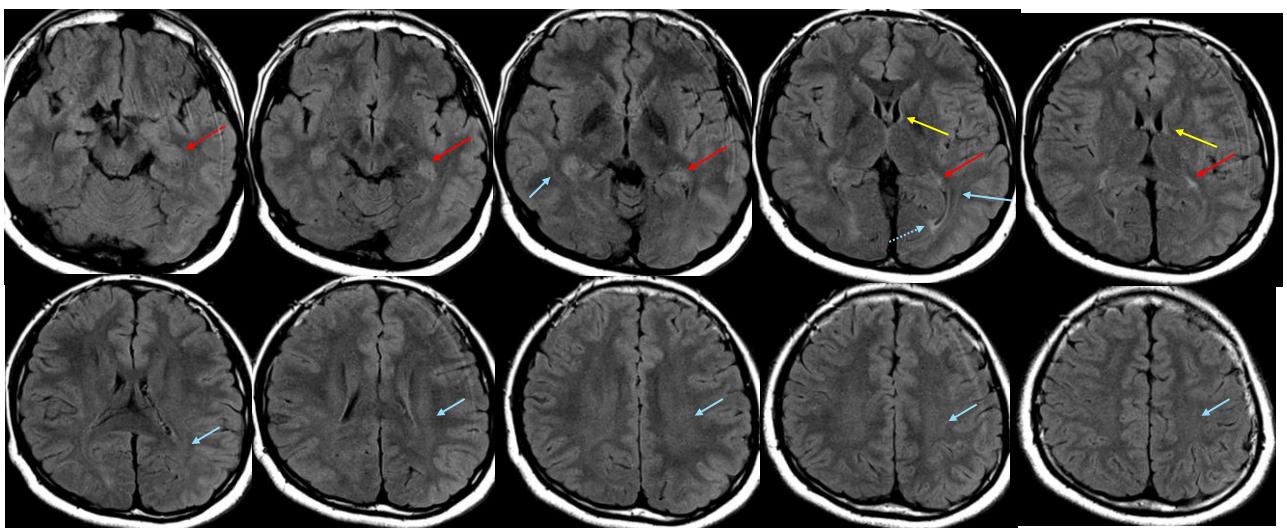
14

・中脳被蓋低形成 ・後頭葉前下内側低形成 ・学業並 ・運動の愁訴なし

浜名湖セミナー例



15



16

## 側脳室隣接部のまとめ

- 胎児脳で神経細胞が増殖する部(germinal zone)として、ventricular zoneの外側に subventricular zoneができた以後、この部がgerminal matrixと呼ばれる。両者は同一部の別名である
- 上記の肥厚部を部位名称をつけてganglionic eminenceと呼ぶ。部位区分は、medial・lateral・caudalは一般的である。この区分ごとに分化する神経細胞機能が異なる
  - germinal zone細胞の機能はganglionic eminence区分ごとに語られる
  - ×ganglionic eminenceから基底核が分化する
- この部はMRIではT2低信号として描出され、在胎20wで最も厚い。この時期は易侵襲性がある\*。胎生期に囊胞となるものの一部は生後germinolysisとして残る。その好発部は parafrontal・caudothalamic・temporalに三分されるが、これはganglionic eminence肥厚部に一致する。胎生期に肥大するものの転帰は不明である
  - \*既知の成因として胎内感染・遺伝子変異がある。低酸素・低血流は主病因にならないであろう
- この部は易出血性であり、出血し、脳室穿破し、脳室内出血となりやすい。この部の病変が出血に至るか否か、早産白質障害を伴うか否かの機序は不明である
- この部のみにMR病変があり、その他に粗大MR病変をとらない患者のなかには、てんかん、特発性尖足、学齢期運動退行を発症するものがある。