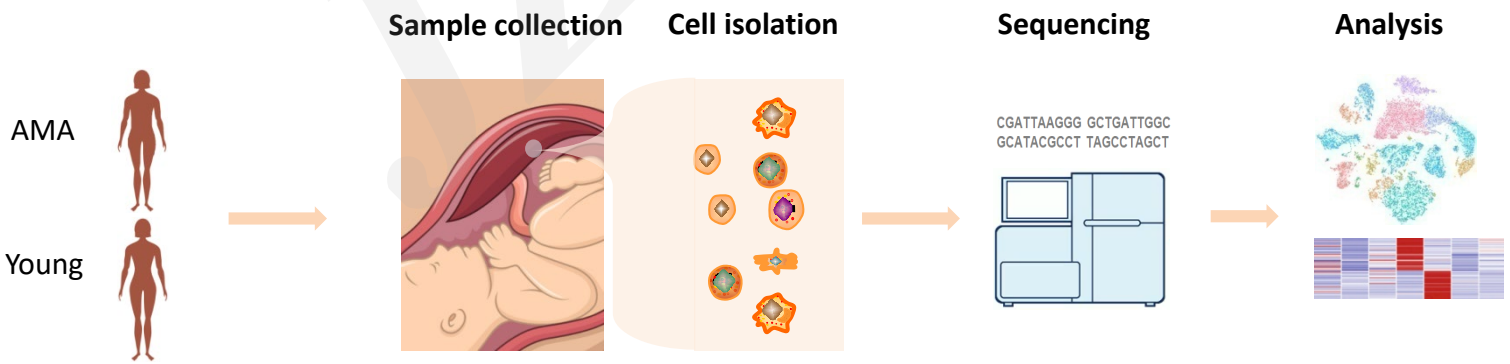
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# Reduced cell invasion may be a characteristic of placental defects in pregnant women of advanced maternal age at single-cell level

**Key words:** Advanced maternal age; Pregnancy complications; Placenta; Trophoblast; Cell invasion; SERPINE1

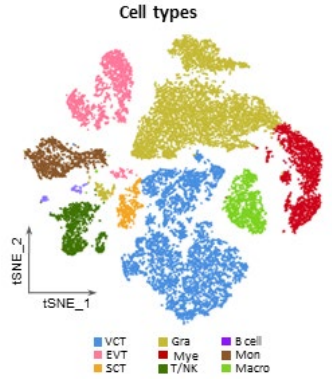
## Research Summary

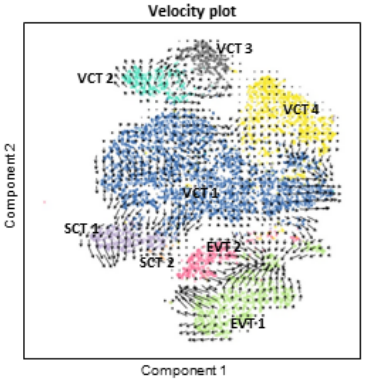
- Describe the cellular signature and transcriptomes of human placentas in AMA women with single-cell RNA sequencing (scRNA-seq).
- Conjoint analysis in single cell sequencing data by bioinformatics.
- The cell invasion ability were observed by *in-vitro* transwell assays after trophoblast cells isolation and culture.
- The specific expression of *SERPINE1* in AMA women were analyzed with clinical samples.
- The role of *SERPINE1* in cell invasion was carried out with HTR8-S/Vneo cells.

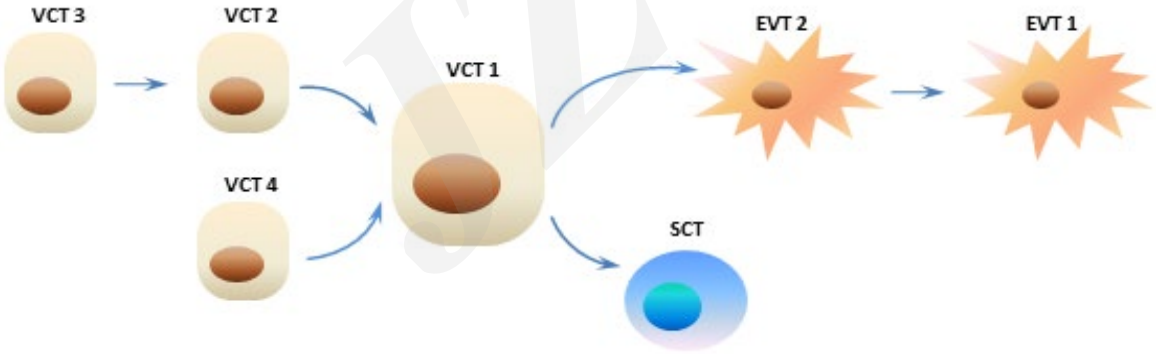


## *Innovation points*

- Nine cell subtypes in the human placenta were identified using scRNA-seq.
- For the first time, the subtypes of the three trophoblast cell types (VCT, EVT, and SCT) were classified and described their roles in placental defects in AMA women.
- A new differentiation trajectory of subsets of trophoblast cells was proposed.



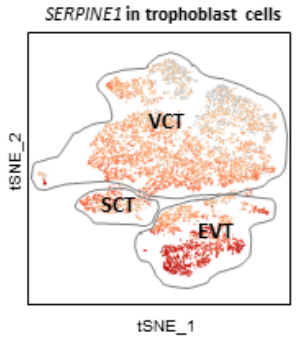



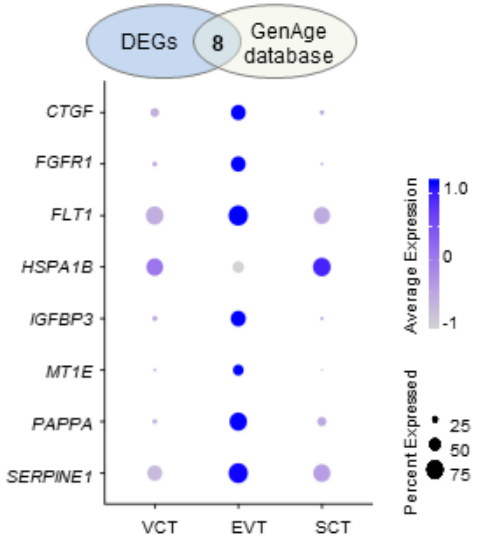




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## *Innovation points*

- The expression of SERPINE1 was significantly increased in the placental tissue of AMA women.
- The cell invasion capability of trophoblast cells in AMA women might be reduced.
- The abnormal expression of SERPINE1 appears to play an important role.




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## *Innovation Results*

1. Overview cell signatures from human placentas determined by scRNA-seq analysis
2. Transcriptome profiling of trophoblast cells
3. Pseudotemporal ordering of subtypes of trophoblast cells
4. Expression and role of SERPINE1 in trophoblast cells of AMA women
5. Reduced cell invasion capability of trophoblast cells in AMA women

Supplementary information:

Table S1-S3; Figs. S1-S2; Materials and methods

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