

# Differential methylation of *ANKRD53* and *GATA3* genes in human miscarriages with trisomy 16

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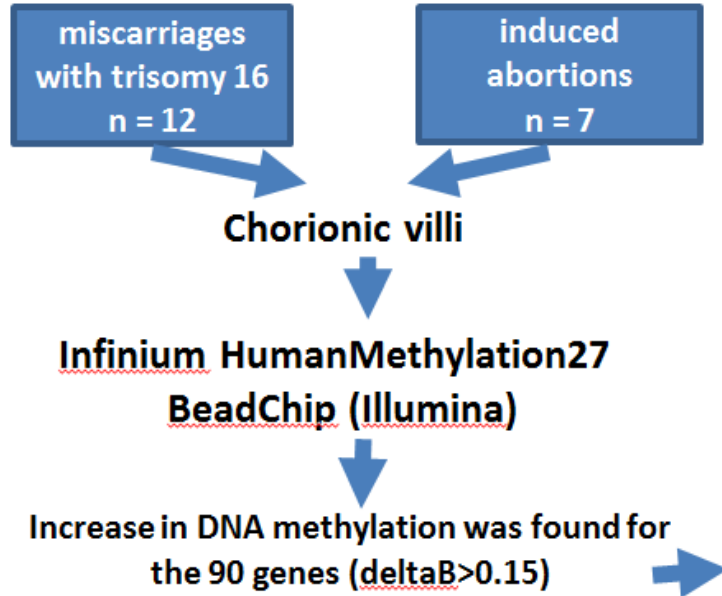
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# Background

- Excess gene dosage at the whole chromosome can affect the global epigenetic landscape.
- Trisomy of chromosome 16 is the most common aneuploidy among human miscarriages.

## Step I

### The genome-wide methylation analysis



Gene	Produce	CGI	dB	Chr
<b>ANKRD53</b>	ankyrin repeat domain 53	TRUE	-0,28	2
<b>TRPV6</b>	transient receptor potential cation channel; subfamily V; member 6	FALSE	-0,27	7
<b>SEC31L2</b>	S. cerevisiae SEC31-like 2 isoform a	TRUE	-0,26	10
<b>CCL2</b>	small inducible cytokine A2 precursor	FALSE	-0,23	17
<b>GATA3-AS1</b>	GATA3 antisense RNA 1	TRUE	-0,23	10
<b>SLC13A4</b>	solute carrier family 13 (sodium/sulfate symporters); member 4	FALSE	-0,22	7
<b>SLC17A4</b>	solute carrier family 17 (sodium phosphate); member 4	FALSE	-0,22	6
<b>CYSLTR2</b>	cysteinyl leukotriene receptor 2	FALSE	-0,22	13
<b>ZNF683</b>	zinc finger protein 683	FALSE	-0,21	1
<b>CALCB</b>	calcitonin-related polypeptide; beta	TRUE	-0,21	11
<b>PDZD3</b>	sodium-phosphate cotransporter IIa C-terminal-associated protein 2	FALSE	-0,21	11
<b>CCR8</b>	chemokine (C-C motif) receptor 8	FALSE	-0,21	3
<b>FANCG</b>	Fanconi anemia; complementation group G	TRUE	-0,21	9
<b>KRTAP10-8</b>	keratin associated protein 10-8	FALSE	-0,20	21
<b>BRS3</b>	bombesin-like receptor 3	FALSE	-0,20	X
<b>CCL21</b>	small inducible cytokine A21 precursor	FALSE	-0,20	9
<b>SLC3A1</b>	solute carrier family 3; member 1	FALSE	-0,20	2

# Step II

48 miscarriages with aneuploidy (with trisomy 16 - 26)

8 miscarriages with normal karyotype (SANK)

7 induced abortions (MA)



**Targeted bisulfite massive parallel sequencing in chorionic villi of the *ANKRD53* and *GATA3* gene promoters**

- Methylation of the CpG sites of these genes did not differ in miscarriages with normal karyotype compared with induced abortions.
- Miscarriages with trisomy 16, but not miscarriages with other aneuploidies, had higher levels of DNA methylation in *ANKRD53* (for 5 from 40 analyzed CpG-sites,  $p < 0.05$ ) and *GATA3* (for 49 from 171 analyzed CpG-sites,  $p < 0.05$ ) genes.

- *GATA3* gene encodes transcription factor, which is a key regulator of trophoblast differentiation, and imbalance of its expression can lead to aberrant trophoblast invasion.
- *ANKRD53* is involved in spindle dynamics and nucleus integrity in mitosis.

