

کاربرد فناوری های اومیکس در درمان سقط مکرر و ناباروری

غلامرضا پورسیفی خیمه سری

دکتری ژنتیک، مرکز جراحی محدود و درمان ناباروری مهر

(بخش ژنتیک و IVF)، رشت،



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Definition of RPL

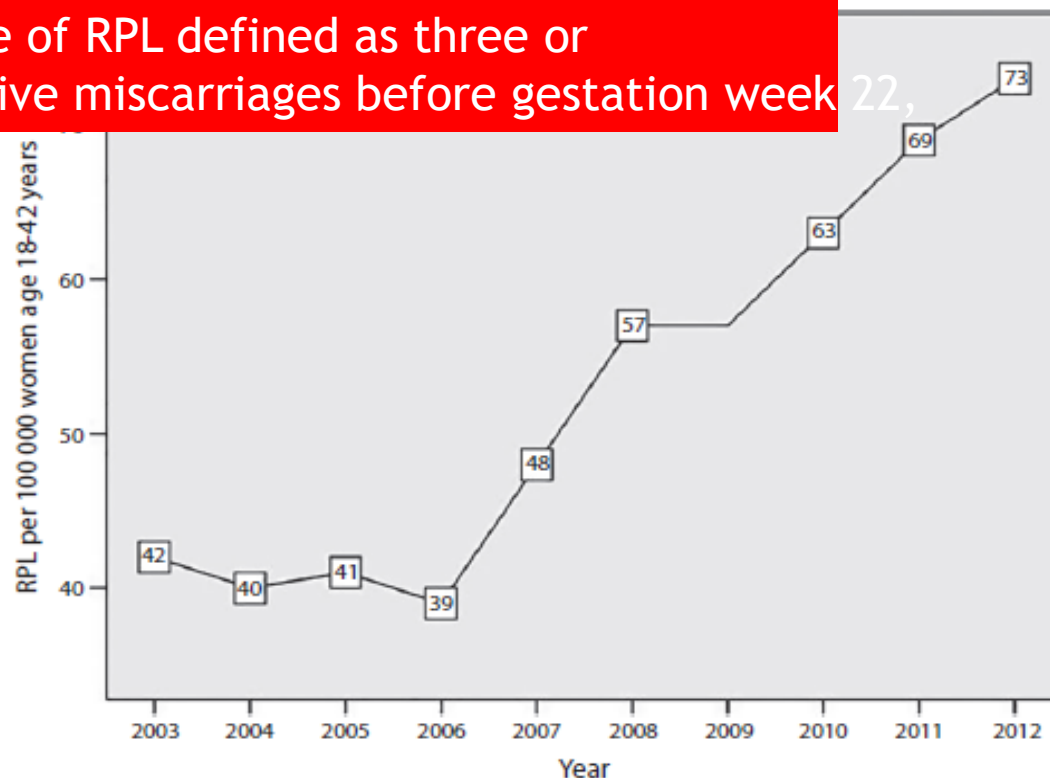
- ▶ A diagnosis of Recurrent Pregnancy Loss (RPL) could be considered after the loss of two or more pregnancies.
- ▶ A pregnancy in the definition is confirmed at least by either serum or urine b-hCG, i.e. including non-visualized pregnancy losses (biochemical pregnancy losses and/or resolved and treated pregnancies of unknown location)
- ▶ Ectopic and molar pregnancies are not included
- ▶ Pregnancy losses both after spontaneous conception and after ART treatments should be included in the definition
- ▶ Primary RPL is described as RPL without a previous ongoing pregnancy (viable pregnancy) beyond 24 weeks' gestation, while secondary RPL is defined as an episode of RPL after one or more previous pregnancies progressing beyond 24 weeks' gestation.
- ▶ Recurrent "Early" Pregnancy Loss (REPL) is the loss of two or more pregnancies **before 10 weeks** of gestational age
- ▶ Prevalence of RPL is between 0.8-1.4% if only clinical miscarriages (confirmed by ultrasound and/ or histology) are included; adding biochemical losses increases the prevalence to 2% to 3%

AOGS ORIGINAL RESEARCH ARTICLE

Is the incidence of recurrent pregnancy loss increasing? A retrospective register-based study in Sweden

EMMA RASMAR ROEPKE¹ , LEIF MATTHIESEN², REBECCA RYLANCE³ & OLE BJARNE CHRISTIANSEN^{4,5} 

The prevalence of RPL defined as three or more consecutive miscarriages before gestation week 22,



RPL: Recurrent pregnancy loss


Figure 2. Incidence of recurrent pregnancy loss (RPL) in women aged 18–42 years. The annual incidence from 2003 to 2012 is calculated as the new number of women with RPL per year in the numerator and counts of women each year aged 18–42 years in the denominator.

Risk factors

- ▶ Women should be sensitively informed that the risk of pregnancy loss is lowest in women aged 20 to 35 years.
- ▶ Women should be sensitively informed that the risk of pregnancy loss rapidly increases after the age of 40.
- ▶ Stress is associated with RPL, but couples should be informed that there is no evidence that stress is a direct cause of pregnancy loss
- ▶ Couples with RPL should be informed that smoking, maternal obesity or being significantly underweight excessive alcohol consumption could have a negative impact on their chances of a live birth

Investigations in RPL

- ▶ Medical and family history could be used to tailor diagnostic investigations in RPL
- ▶ Information on previous diagnosis of medical conditions that may be associated with RPL, including thrombophilia, PCOS, and diabetes, or a family history of hereditary thrombophilia should be collected

- 
- ▶ some diagnostic tests, although not recommended for all couples, can be relevant only in selected RPL couples, for instance:
 - prolactin testing in women with clinical symptoms of hyperprolactinemia (oligo-amenorrhea)
 - HLA class II determination in women with secondary RPL after the birth of a boy
 - sperm DNA fragmentation assessment can be more relevant in males with unhealthy lifestyles
(smoking, alcohol, excessive exercise, unhealthy body weight)

- ▶ parental karyotyping is less relevant in couples with female age above 39, less than 3 pregnancy losses and a negative family history, as in these couples the chance of being a carrier of a translocation is very low (below 2.2 %)
- ▶ Female age and number of previous losses are the only known factors consistently shown to impact prognosis

Screening for genetic factors

- ▶ Aneuploidies occur in comparable frequencies in both women with sporadic and recurrent pregnancy loss
- ▶ Determining the chromosomal status of pregnancy tissue from women with recurrent pregnancy loss may provide them with a cause or reason for the particular loss being investigated, but it does not necessarily rule out other underlying conditions.
- ▶ No clear effect of genetic testing of the pregnancy tissue on prognosis (subsequent live birth) has been described so far
- ▶ Genetic analysis of **pregnancy tissue is not** routinely recommended but it could be performed for explanatory purposes
- ▶ The preferred method of genetic analysis is array-CGH, as this is not limited by tissue culture failure or false negative results due to maternal cell contamination.



Genetic and epigenetic variations associated with idiopathic recurrent pregnancy loss

Luis Alejandro Arias-Sosa¹ · Iván Darío Acosta¹ · Elkin Lucena-Quevedo² · Harold Moreno-Ortiz² · Clara Esteban-Pérez² · Maribel Forero-Castro¹

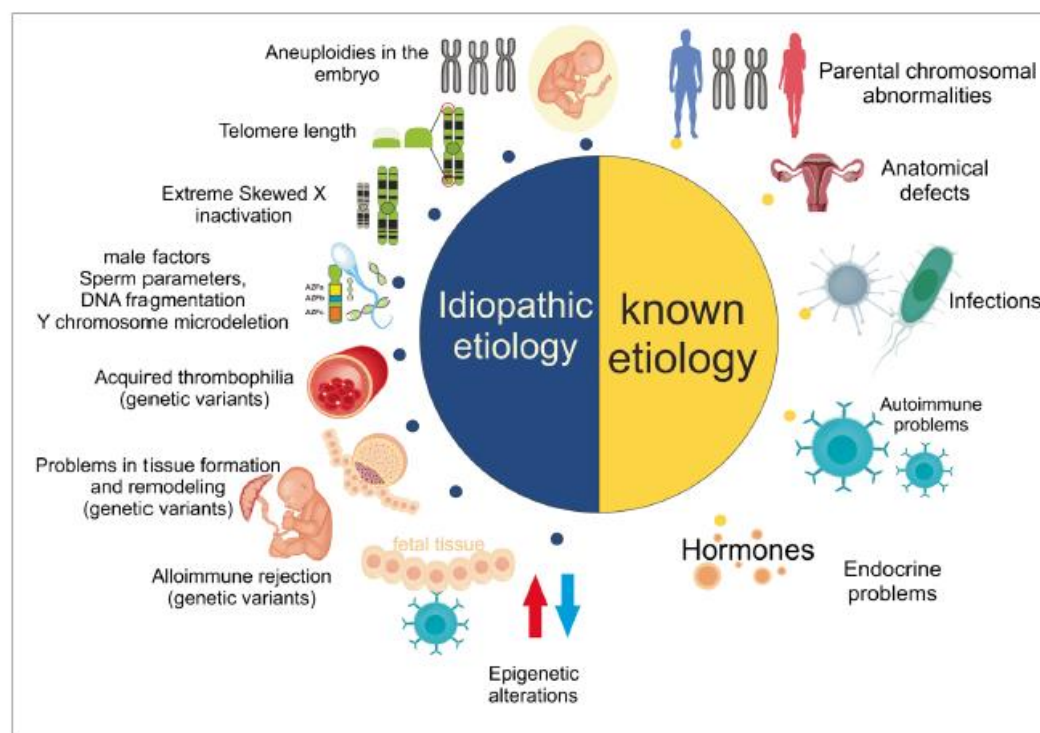



Fig. 3 Associated factors of RPL. The known etiology includes proven causes of RPL. The idiopathic etiology is limited to cases in which there is no scientific consensus, but recent studies have found associations with the disease

PARENTAL GENETIC ANALYSIS

- ▶ Parental karyotyping is not routinely recommended in couples with RPL
- ▶ It could be carried out after individual assessment of risk: *previous birth of a child with cong. abnormality, translocation in the pregnancy tissue, child with unbalanced chromosome abn.*
- ▶ Parental karyotyping may provide couples with a possible contributing factor and prognostic information for the subsequent pregnancy.

- 
- ▶ Regarding prognosis, couples should be informed that, even if a parental abnormality is found after karyotyping, the cumulative live birth rates are good, as are the chances of a healthy child, despite a higher risk of a subsequent pregnancy loss.
 - ▶ They should be informed of the limitations of karyotyping, including that karyotyping does not predict unbalanced translocation in next pregnancy.

Does preimplantation genetic diagnosis improve reproductive outcome in couples with recurrent pregnancy loss owing to structural chromosomal rearrangement? A systematic review

2018

**Mahmoud Ieys ^{a,b}, Justin Tan ^{a,1}, Omur Taskin ^a, Sukainah Alfaraj ^a,
Faten F AbdelHafez ^c, Ahmed H Abdellah ^b, Mohamed A Bedaiwy ^{a,*}**

Recurrent pregnancy loss (RPL) is a common, yet elusive, complication of pregnancy. Among couples at high risk of RPL, such as those carrying a structural chromosomal rearrangement, preimplantation genetic diagnosis (PGD) has been proposed as a tool to improve live birth rates and reduce the incidence of miscarriage; however, no clear consensus has been reached on its benefits in this population. This systematic review summarizes existing published research on the effect of PGD on pregnancy outcomes among carriers of chromosomal abnormalities with RPL. A comprehensive search of common databases was conducted, which yielded 20 studies. Meta-analysis was precluded owing to significant heterogeneity between studies. The primary outcome of interest was live birth rate (LBR), and a pooled total of 847 couples who conceived naturally had a LBR ranging from 25–71% compared with 26.7–87% among 562 couples who underwent IVF and PGD. Limitations of the study include lack of large comparative or randomized control studies. Patients experiencing RPL with structural chromosomal rearrangement should be counselled that good reproductive outcomes can be achieved through natural conception, and that IVF–PGD should not be offered first-line, given the unproven benefits, additional cost and potential complications associated with assisted reproductive technology.

Recurrent pregnancy loss evaluation combined with 24-chromosome microarray of miscarriage tissue provides a probable or definite cause of pregnancy loss in over 90% of patients

F. Popescu¹, C. R. Jaslow¹, and W. H. Kutteh^{2,3,4,*}

STUDY QUESTION: Will the addition of 24-chromosome microarray analysis on miscarriage tissue combined with the standard American Society for Reproductive Medicine (ASRM) evaluation for recurrent miscarriage explain most losses?

WHAT IS KNOWN ALREADY: RPL is estimated to occur in 2–4% of reproductive age couples. A probable cause can be identified in approximately 50% of patients after an ASRM recommended workup including an evaluation for parental chromosomal abnormalities, congenital and acquired uterine anomalies, endocrine imbalances and autoimmune factors including antiphospholipid syndrome.

STUDY DESIGN, SIZE, DURATION: Single-center, prospective cohort study that included 100 patients seen in a private RPL clinic from 2014 to 2017. All 100 women had two or more pregnancy losses, a complete evaluation for RPL as defined by the ASRM, and miscarriage tissue evaluated by 24-chromosome microarray analysis after their second or subsequent miscarriage.

MAIN RESULTS AND THE ROLE OF CHANCE: A definite or probable cause of pregnancy loss was identified in the vast majority (95/100; 95%) of RPL patients when a 24-chromosome pair microarray evaluation of POC testing is combined with the standard ASRM RPL workup evaluation at the time of the second or subsequent loss. The ASRM RPL workup identified an abnormality and a probable explanation for pregnancy loss in only 45/100 or 45% of all patients. A definite abnormality was identified in 67/100 patients or 67% when initial testing was performed using 24-chromosome microarray analyses on the miscarriage tissue. Only 5/100 (5%) patients, who had a euploid loss and a normal ASRM RPL workup, had a pregnancy loss without a probable or definitive cause identified. All other losses were explained by an abnormal 24-chromosome microarray analysis of the miscarriage tissue, an abnormal finding of the RPL workup, or a combination of both.

Results from the cost analysis indicated that an initial approach of using a 24-chromosome microarray analysis on miscarriage tissue resulted in a 50% savings in cost to the health care system and to the patient.

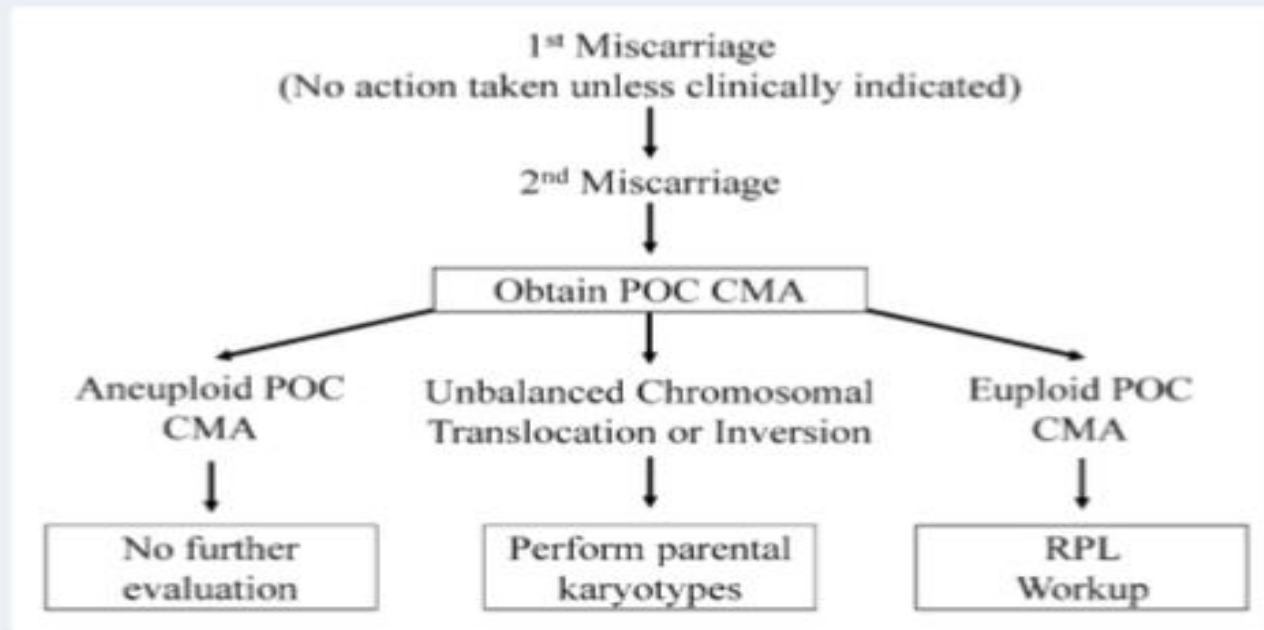


Figure 1 The proposed testing algorithm for recurrent pregnancy loss (RPL) evaluation and treatment based on the chromosome microarray analysis (CMA) diagnosis obtained from products of conception (POC) at the time of the second or subsequent pregnancy loss.

In conclusion, these data support the proposed new algorithm for the evaluation of RPL. The performance of a CMA of miscarriage tissue after the second or subsequent pregnancy loss, followed by the ASRM RPL workup when POC results are normal, is an effective means for determining the cause of RPL. The combination of a genetic evaluation on miscarriage tissue with an evidence-based evaluation for RPL will provide a probable or definitive cause in over 90% of all miscarriages.

HEREDITARY THROMBOPHILIA

- ▶ There is **no**, or at best a weak, association between RPL and hereditary thrombophilia
- ▶ A significant association between the factor V Leiden (F5 c.1691G>A) genotype and RPL (OR 2.02; 95% CI 1.60-2.55; based on 33 case- control studies), and between the factor V Leiden mutation and the risk of a pregnancy loss in the next pregnancy (OR 1.93; 95% CI 1.21-3.09; based on 4 prospective cohort studies).
- ▶ Carriers of the Factor V Leiden mutation were more likely to have a subsequent loss as compared to non-carriers (OR 2.03; 95% CI 1.29-3.17; based on eight cohort studies)

Factor V Leiden mutation in women with early recurrent pregnancy loss: a meta-analysis and systematic review of the causal association

C. Sergi · T. Al Jishi · M. Walker

Results Nine studies met the inclusion criteria and were selected for review. A total of 2,147 women were screened for the FVL mutation, 1,305 women with early RPL, and 842 women with no gestational complications. Women with early RPL had indeed a statistically significantly increased carrier frequency of FVL mutation, the common OR being 1.68 (95 % CI: 1.16–2.44).

Conclusion FVL carrier state may increase the susceptibility for early RPL. Testing for FVL mutation should be considered in women with unexplained early RPL and thrombophylaxis has been suggested in women with unexplained RPL associated with FVL mutation.

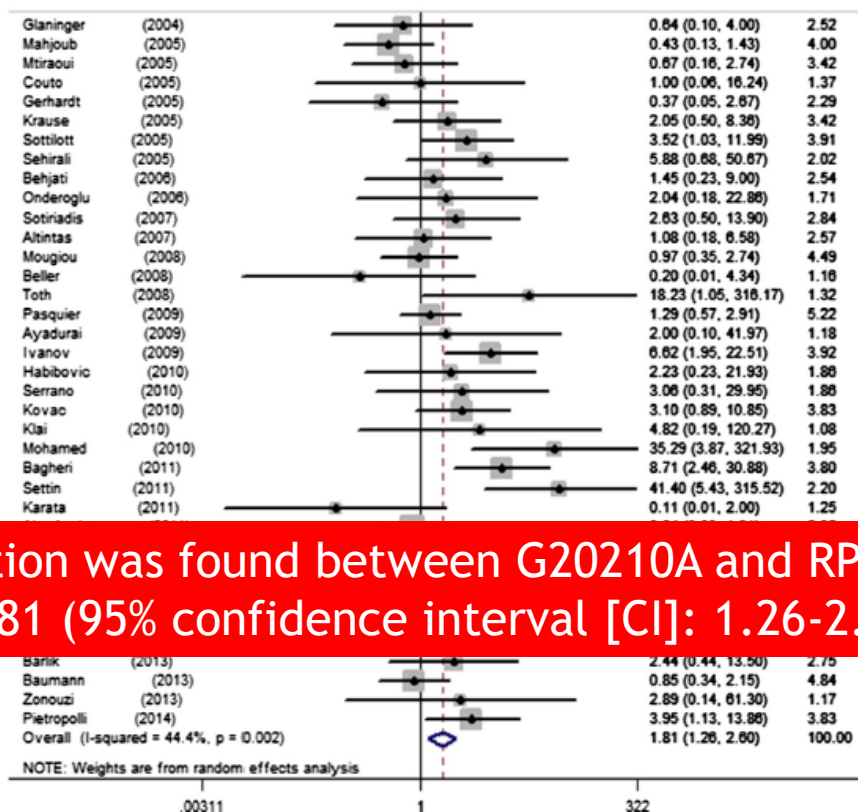
Regular Article

Prothrombin G20210A mutation is associated with recurrent pregnancy loss: A systematic review and meta-analysis update

Hui Gao^a, Fang-biao Tao^{a,b,*}

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^b Anhui Provincial Key Laboratory of Population Health & Aristogenics, Hefei (230032), China



A significant association was found between G20210A and RPL, with a combined odds ratio (OR) of 1.81 (95% confidence interval [CI]: 1.26-2.60).

Fig. 2. Forest plots for the association between RPL and G20210A in overall populations. Results of individual and summary odds ratio (OR) estimates, 95% confidence interval (CI) and weights of each study are shown. Horizontal lines represent 95% CI and dotted vertical lines represent the value of the summary OR.

Maternal Thrombophilia and Recurrent Miscarriage – Is There Evidence That Heparin is Indicated as Prophylaxis against Recurrence?

► **Table 5** Comparison of recommendations in the most recent German, American and British guidelines on RSA (< 20th week of pregnancy) and maternal thrombophilia without prior VTE.

2013

2012

2011

| RSA without VTE | German guideline [37] | American guideline [38] | British guideline [39] |
|--|--|--|---|
| Screening for APS (LA, anticardiolipin antibodies IgG and IgM, anti-β2 GP1 antibodies IgG and IgM) | Yes | Yes (level of evidence 1B) | Yes (level of evidence D) |
| Screening for hereditary thrombophilia | AT activity, APC resistance/FVL, PGM | No (level of evidence 2C) | Only if the reason for pregnancy loss from the 2nd trimester is unclear: FVL, PGM, protein S deficiency (level of evidence D) |
| Prophylactic administration of medication | | | |
| Hereditary thrombophilia | No administration outside clinical studies | No (level of evidence 2C) | LMWH for pregnancy losses from the 2nd trimester (level of evidence A) |
| APS | Low-dose ASA and LMWH | Low-dose ASA and LMWH (level of evidence 1B) | Low-dose ASA and LMWH (level of evidence B) |

RSA: recurrent spontaneous abortion; VTE: venous thromboembolism; LA: lupus anticoagulant; AT activity: antithrombin activity; APC resistance: anti-protein C resistance; FVL: factor V Leiden mutation; PGM: prothrombin gene (G20210A) mutation; APS: antiphospholipid syndrome; LMWH: low molecular weight heparin

► **Table 6** Recommendation for LMWH administration during pregnancy if maternal thrombophilia is present.

| | Recurrent early pregnancy loss/late pregnancy loss | Increased maternal risk for VTE |
|--------------------------|--|---------------------------------|
| Hereditary thrombophilia | No | Yes |
| APS | 75–100 mg ASA/day, optimally initiated before conception, combined with LMWH from the time of a positive pregnancy test until 6 weeks post partum ¹ | |

LMWH: low molecular weight heparin; VTE: venous thromboembolism; APS: antiphospholipid syndrome.

¹ During pregnancy, blood pressure, proteinuria and maternal weight from the 16th–20th GW must be monitored along with monthly monitoring of fetal growth and placental perfusion.

Osteoporosis prophylaxis must be combined with monitoring thrombocyte counts during LMWH treatment in accordance with the AWMF S3 guideline [41] (between the 5th to 15th day after the start of LMWH; a drop of the thrombocyte count to less than 50% of the initial count is suspicious for heparin-induced thrombopenia type IIa, which would necessitate the immediate cessation of heparin therapy).

Male Factors

- ▶ A meta-analysis showed a significant increase in miscarriage rates in men with high sperm DNA damage compared with those with low sperm DNA damage (RR 2.16; 95% CI 1.54-3.03).
- ▶ In the male partner, **it is suggested** to assess life style factors (smoking, alcohol consumption, exercise pattern, and body weight)
- ▶ Assessing **sperm DNA fragmentation** in couples with RPL **can be considered** for explanatory purposes, based on indirect evidence

Treatment efficacy for idiopathic recurrent pregnancy loss – a systematic review and meta-analyses

2018

Emma RASMARK ROEPKE¹, Margareta HELLGREN², Ragnhild HJERTBERG³, Lennart BLOMQVIST⁴, Leif MATTHIESEN^{5,†}, Emir HENIC⁶, Sujata LALITKUMAR⁷ & Annika STRANDELL²

Introduction: Medical treatment of women with idiopathic recurrent pregnancy loss is controversial. The objective was to assess the effects of different treatments on live birth rates and complications in women with unexplained recurrent pregnancy loss. *Material and methods:* We searched Medline, Embase, the Cochrane Library and identified 1415 publications. This systematic review included 21 randomized controlled trials regarding acetylsalicylic acid, low-molecular-weight heparin, progesterone, intravenous immunoglobulin or leukocyte immune therapy in women with ≥ 3 consecutive miscarriages of unknown cause. The study quality was assessed and data was extracted independently by at least two authors. *Results:* No significant difference in live birth rate was found, neither when acetylsalicylic acid was compared with low-molecular-weight heparin nor with placebo. Meta-analyses of low-molecular-weight heparin vs. control found no significant differences in live birth rate; risk ratio (RR) 1.47 (95% CI 0.83-2.61). Treatment with progesterone starting in the luteal phase seemed effective in increasing live birth rate; RR 1.18 (95% CI 1.09-1.27) but not when started after conception. Intravenous immunoglobulin showed no effect on live birth rate compared with placebo; RR 1.07 (95% CI 0.91-1.26). Paternal immunization compared with autologous immunization showed a significant difference in outcome; RR 1.8 (95% CI 1.34-2.41), although the studies were small and at high risk of bias. *Conclusion:* The literature does not allow advice on any specific treatment for idiopathic

recurrent pregnancy loss, with the exception of progesterone from ovulation. We suggest that any treatment for recurrent pregnancy loss should be used within the context of a randomized controlled trial.

Invited Editorial

Pregnancy loss: French clinical practice guidelines



Editorial / European Journal of Obstetrics & Gynecology and Reproductive Biology 201 (2016) 18–26

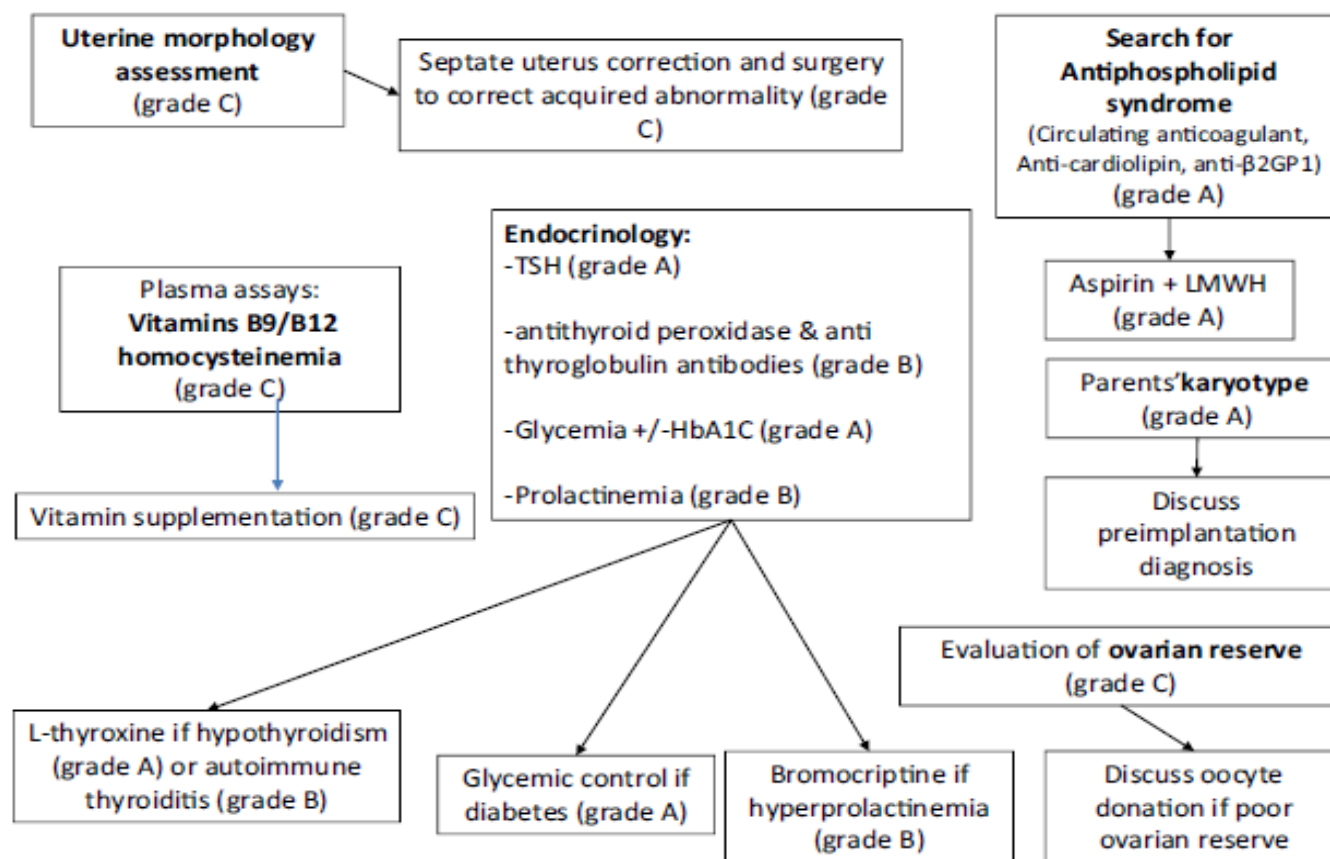


Fig. 3. Algorithm for evaluation and management of recurrent pregnancy loss.

RPL

ASRM

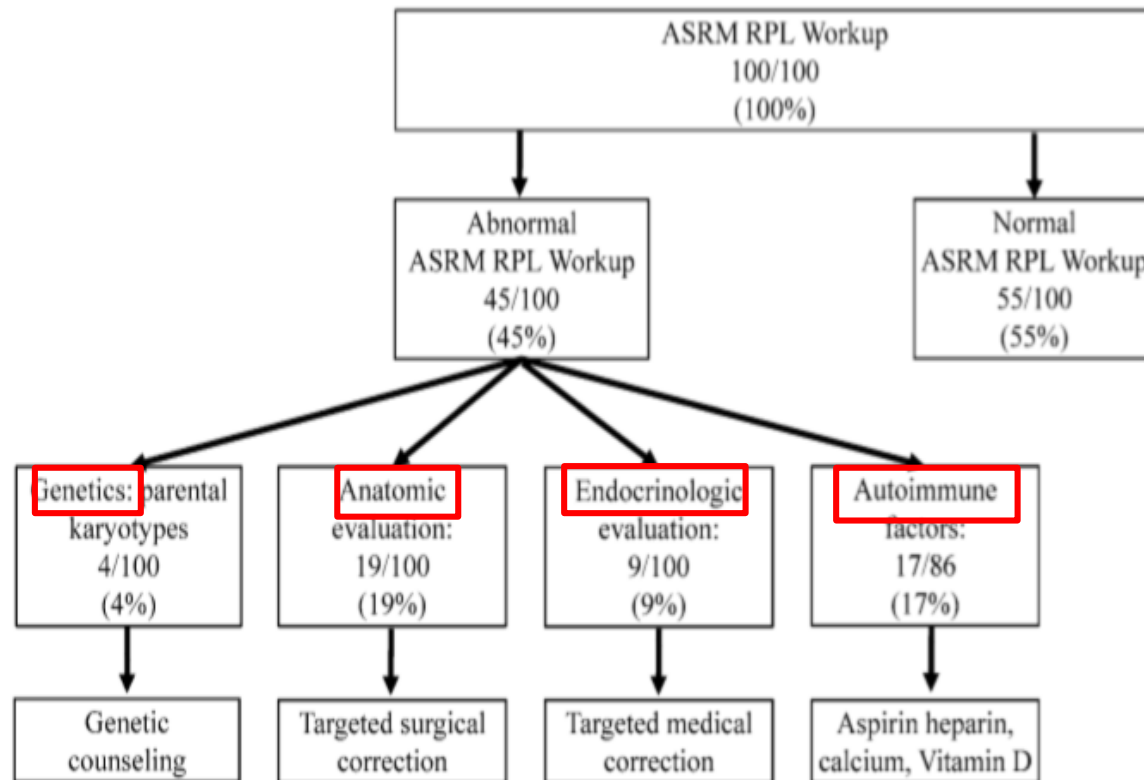


Figure 2 Frequency of American Society of Reproductive Medicine—recurrent pregnancy loss (ASRM RPL) workup abnormalities among all 100 RPL patients evaluated and the recommended treatment for each abnormality result. See 'Materials and Methods' for details of evaluation.



GEO DataSets

GEO DataSets ▾

recurrent abortion



Search

Create alert Advanced

Help

Entry type

DataSets (0)

Series (3)

Samples (0)

Platforms (0)

Organism

Customize ...

Study type

clear

✓ Expression profiling by array

Methylation profiling by array

Customize ...

Author

Customize ...

Attribute name

tissue (2)

strain (0)

Customize ...

Publication dates

30 days

1 year

Custom range...

Clear all

Summary ▾ Sort by Number of Samples (High to Low) ▾

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Search results

Items: 3

1 Filters activated: Expression profiling by array. [Clear all](#) to show 363 items.

- ☐ [Comparison of endometrial expression in patients which underwent previous recurrent abortions, implantation failure after IVF/ICSI compared to control fertile](#)

(Submitter supplied) In order to identify pre-conceptional endometrial dysregulations, we compared the endometrial expression between fertile and IF and RM patients

Organism: Homo sapiens

Type: Expression profiling by array

Platform: GPL570 15 Samples

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Series Accession: GSE26787 ID: 200026787

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Search details

```
("abortion, habitual"[MeSH  
Terms] OR recurrent  
abortion[All Fields]) AND  
"Expression profiling by  
array"[Filter]
```

Search

See more...

Scope: Format: Amount: GEO accession: **Series GSE26787**[Query DataSets for GSE26787](#)

| | |
|------------------|--|
| Status | Public on Jan 22, 2011 |
| Title | Comparison of endometrial expression in patients which underwent previous recurrent abortions, implantation failure after IVF/ICSI compared to control fertile |
| Organism | Homo sapiens |
| Experiment type | Expression profiling by array |
| Summary | In order to identify pre-conceptional endometrial dysregulations, we compared the endometrial expression between fertile and IF and RM patients |
| Overall design | Total RNA were extracted and used for hybridizing Affymetrix chips (GeneChip Human Genome U133 Plus2.0 Array). Data were normalised by gcRMA method and raw p-values adjusted by Bonferroni procedure (1%). Endometrial biopsy was performed in non conceptional cycle in the middle luteal phase-(5 women were selected in each group). |
| Contributor(s) | Lédée N , Munaut C |
| Citation(s) | 22025212 |
| Submission date | Jan 21, 2011 |
| Last update date | Mar 25, 2019 |
| Contact name | Nathalie Lédée |


```

# Version info: R 3.2.3, Biobase 2.30.0, GEOquery 2.40.0, limma 3.26.8
#####
# Differential expression analysis with limma
library(GEOquery)
library(limma)
library(umap)

# load series and platform data from GEO

gset <- getGEO("GSE26787", GSEMatrix=TRUE, AnnotGPL=TRUE)
if (length(gset) > 1) idx <- grep("GPL570", attr(gset, "names")) else idx <- 1
gset <- gset[[idx]]

# make proper column names to match toptable
fvarLabels(gset) <- make.names(fvarLabels(gset))

# group membership for all samples
gsm <- "000000000011111"
sml <- strsplit(gsm, split="")[[1]]

# filter out excluded samples (marked as "X")
sel <- which(sml != "X")
sml <- sml[sel]
gset <- gset[, sel]

# log2 transformation
ex <- exprs(gset)
qx <- as.numeric(quantile(ex, c(0., 0.25, 0.5, 0.75, 0.99, 1.0), na.rm=T))
log2C <- (qx[5] > 100) || (qx[6]-qx[1] > 50 && qx[2] > 0)
if (log2C) { ex[which(ex <= 0)] <- NA }
exprs[gset] <- log2(ex) }

# assign samples to groups and set up design matrix
- - - - -

gs <- factor(sml)
groups <- make.names(c("Tm", "HPL"))
levels(gs) <- groups
getGroup <- gs
design <- model.matrix(~group + 0, gset)
colnames(design) <- levels(gs)

fit <- lmFit(gset, design) # fit linear model

# set up contrasts of interest and recalculate model coefficients
ct <- paste0(group[1], group[2], sep="-")
cont.matrix <- makeContrasts(contrasts=cts, levels=design)
fit2 <- contrasts.fit(fit, cont.matrix)

# compute statistics and table of top significant genes
fit2 <- eBayes(fit2, 0.01)
t1 <- topTable(fit2, adjust="fdr", sort.by="B", number=250)
t1 <- subset(t1, select=c("ID", "adj.P.Val", "P.Value", "t", "B", "logFC", "Gene.symbol", "Gene.title"))
write.table(t1, file=tout1(), row.names=FALSE, sep="\t")

# Visualize and quality control test results.
# Build histogram of P-values for all genes. Normal test
# assumption is that most genes are not differentially expressed.
t12 <- topTable(fit2, adjust="fdr", sort.by="B", number=Inf)
hist(t12$adj.P.Val, col="gray", border="white", xlab="P-adj",
     ylab="Number of genes", main="P-adj value distribution")

# summarize test results as "up", "down" or "not expressed"
df <- decideTests(fit2, adjust.method="fdr", p.value=0.05)

# Venn diagram of results
vennDiagram(df, circle.col=palette())

#####

# create Q-Q plot for t-statistic
t.good <- which(!is.na(fit2$F)) # filter out bad probes
qqt(fit2$t[t.good], fit2$df.total[t.good], main="Moderated t statistic")

# volcano plot (log P-value vs log fold change)
colnames(fit2) # list contrast names
ct <- 1 # choose contrast of interest
volcanoplot(fit2, coef=ct, main=colnames(fit2)[ct], pch=20,
  highlight=length(which(df[,ct]!=0), names=rep('+', nrow(fit2)))

# MD plot (log fold change vs mean log expression)
# highlight statistically significant (p-adj < 0.05) probes
plotMD(fit2, column=ct, status=df[,ct], legend=F, pch=20, cex=1)
abline(h=0)

#####
# General expression data analysis
ex <- exprs(gset)

# box-and-whisker plot
ord <- order(gs) # order samples by group
palette(c("189E77", "#7570B3", "#E7298A", "#E6AB02", "#D95F02",
  "#66A61E", "#A6761D", "#B32424", "#B32483", "#666666"))
par(mar=c(7,4,2,1))
title <- paste("GSE26787", "/", annotation(gset), sep="")
boxplot[ex,ord], boxwex=0.6, notch=T, main=title, outline=FALSE, las=2, col=gs[ord])
legend("topleft", groups, fill=palette(), bty="n")

# expression value distribution
par(mar=c(4,4,2,1))
title <- paste("GSE26787", "/", annotation(gset), " value distribution", sep="")
plotDensities(ex, group=gs, main=title, legend="topright")

# UMAP plot (dimensionality reduction)
ex <- na.omit(ex) # eliminate rows with NAs
ex <- ex[!duplicated(ex), ] # remove duplicates
ump <- umap(t(ex), n_neighbors = 5, random_state = 123)
par(mar=c(3,3,2,6), xpd=TRUE)
plot(ump$layout, main="UMAP plot, nbrs=5", xlab="", ylab="", col=gs, pch=20, cex=1.5)
legend("topright", inset=c(-0.15,0), legend=levels(gs), pch=20,
  col=1:nlevels(gs), title="Group", pt.cex=1.5)
library("maptools") # point labels without overlaps
pointLabel(ump$layout, labels = rownames(ump$layout), method="SANN", cex=0.6)

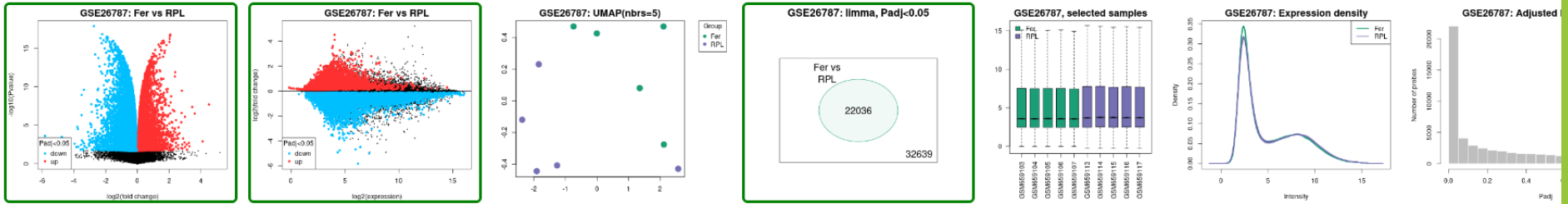
# mean-variance trend, helps to see if precision weights are needed
plotSA(fit2, main="Mean variance trend, GSE26787")

```

Reanalyze

 if you changed any options.

Visualization ?



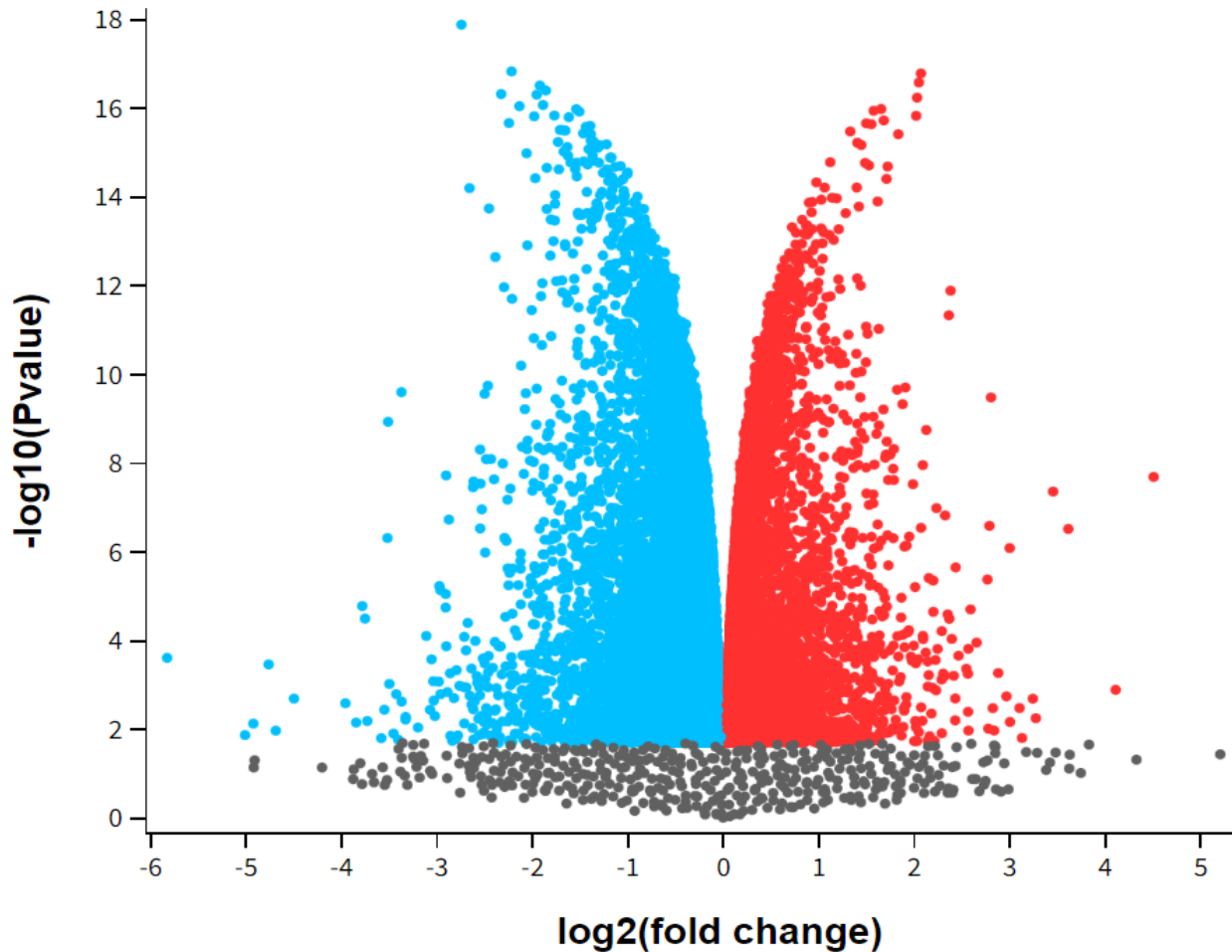
Top differentially expressed genes ?

Download full table

Select columns

| ID | adj.P.Val | P.Value | t | B | logFC | Gene.symbol | Gene.title |
|---|-----------|----------|--------|------|--------|--------------|-----------------------|
| 229941_at | 7.08e-14 | 1.29e-18 | -278.9 | 30.8 | -2.744 | FAM166B | family with seque... |
| 206807_s_at | 2.97e-13 | 1.47e-17 | -211.4 | 29.6 | -2.219 | ADD2 | adducin 2 |
| 240270_x_at | 2.97e-13 | 1.63e-17 | 208.9 | 29.5 | 2.07 | | |
| 1562896_at | 3.33e-13 | 2.60e-17 | 198.1 | 29.2 | 2.049 | TNRC18 | trinucleotide repe... |
| 1566471_at | 3.33e-13 | 3.05e-17 | -194.5 | 29.1 | -1.922 | LOC100996506 | uncharacterized L... |
| 221889_at | 3.35e-13 | 3.94e-17 | -188.9 | 29 | -1.86 | KCTD13 | potassium chann... |
| 208156_x_at | 3.35e-13 | 4.74e-17 | -184.9 | 28.8 | -2.328 | EPPK1 | epiplakin 1 |
| www.ncbi.nlm.nih.gov/geo/geo2r/?acc=GSE26787# | | 4.91e-17 | -184.2 | 28.8 | -1.955 | ARHGAP23 | Rho GTPase acti... |

Volcano plot
GSE26787: Comparison of endometrial
expression in patients which...
F vs RPL, $P_{adj} < 0.05$





Top differentially expressed genes ?

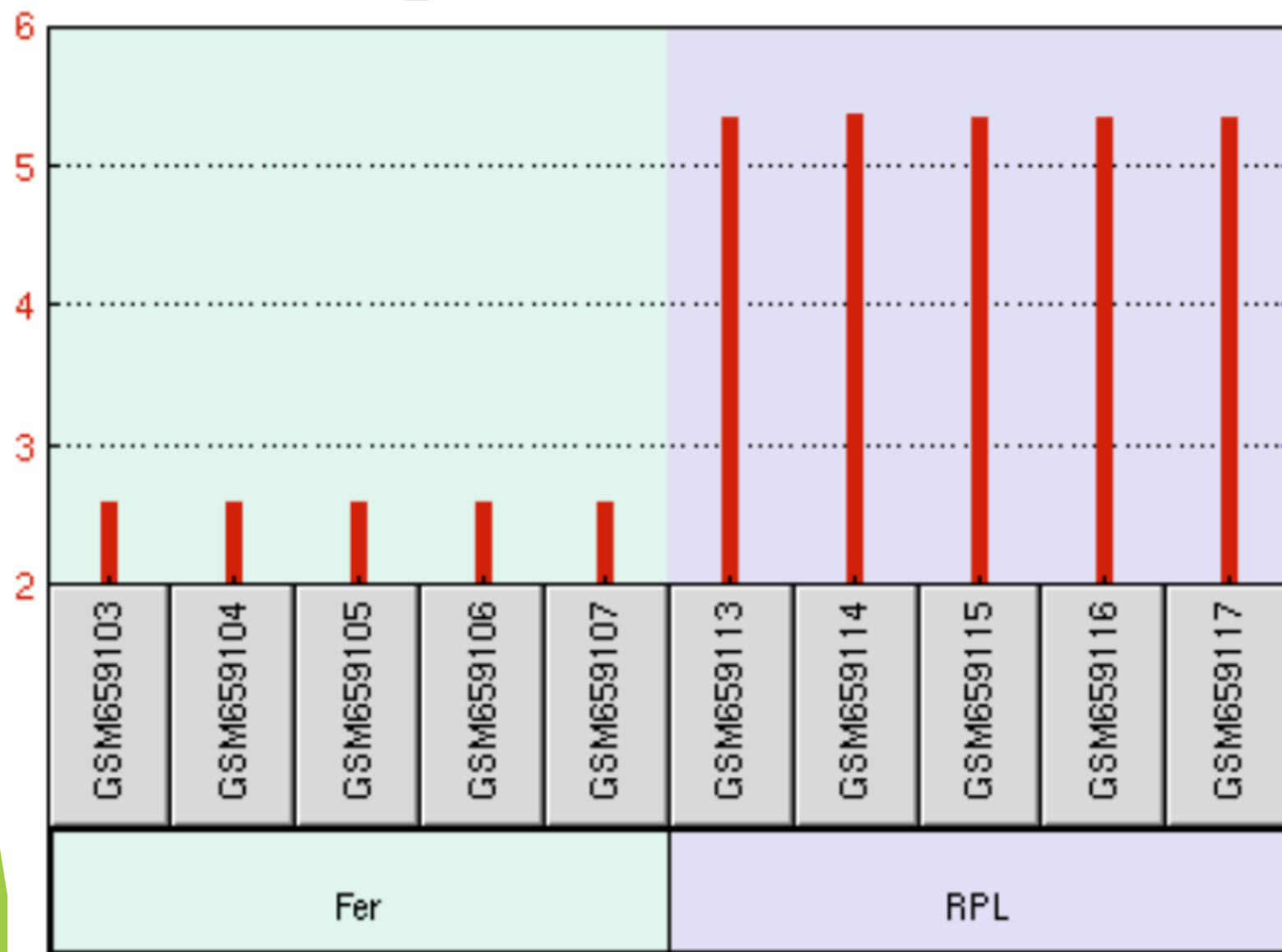
[Download full table](#) [Select columns](#)

| ID | P.Value | Gene.symbol | Gene.title |
|-------------|----------|--------------|--------------------------------------|
| 229941_at | 1.29e-18 | FAM166B | family with sequence similarity 1... |
| 206807_s_at | 1.47e-17 | ADD2 | adducin 2 |
| 240270_x_at | 1.63e-17 | | |
| 1562896_at | 2.60e-17 | TNRC18 | trinucleotide repeat containing 18 |
| 1566471_at | 3.05e-17 | LOC100996506 | uncharacterized LOC100996506 |
| 221889_at | 3.94e-17 | KCTD13 | potassium channel tetramerizati... |
| 208156_x_at | 4.74e-17 | EPPK1 | epiplakin 1 |
| 230196_x_at | 4.91e-17 | ARHGAP23 | Rho GTPase activating protein 23 |
| 226964_at | 5.73e-17 | TTBK2 | tau tubulin kinase 2 |
| 240854_x_at | 8.37e-17 | | |
| 236867_at | 8.92e-17 | | |
| 205050_s_at | 1.03e-16 | MAPK8IP2 | mitogen-activated protein kinas... |
| 239117_at | 1.04e-16 | | |
| 224283_x_at | 1.13e-16 | IL18BP | interleukin 18 binding protein |
| 214674_at | 1.18e-16 | USP19 | ubiquitin specific peptidase 19 |
| 215741_x_at | 1.45e-16 | AKAP8L | A-kinase anchoring protein 8 like |
| 239235_at | 1.47e-16 | | |

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