## Scatterplot of all genes



Rank-rank plot of all genes



Rank in contrast young

## number of genes in each quadrant







geneset size

## number of genesets FDR<0.05



## Scatterplot of all gene sets; FDR<0.05 in red



Scatterplot of all gene sets; top 50 in red





HS-GAG-biosynthesis Heparan-sulfate/heparin-(HS-GAG)-metabolism TNFs-bind-their-physiological-receptors Presynaptic-depolarization-and-calcium-channel-opening Activation-of-the-pre-replicative-complex Downregulation-of-SMAD2/3:SMAD4-transcriptional-activity Endosomal-Sorting-Complex-Required-For-Transport-(ESCRT) Biosynthesis-of-the-N-glycan-precursor-(dolichol-lipid-linked-oligosaccharide Intra-Golgi-traffic N-glycan-antennae-elongation-in-the-medial/trans-Golgi Termination-of-O-glycan-biosynthesis Triglyceride-catabolism Protein-ubiquitination DNA-Replication-Pre-Initiation Assembly-of-the-pre-replicative-complex The-role-of-GTSE1-in-G2/M-progression-after-G2-checkpoint Degradation-of-AXIN Ubiquitin-dependent-degradation-of-Cyclin-D AUF1-(hnRNP-D0)-binds-and-destabilizes-mRNA CDT1-association-with-the-CDC6:ORC:origin-complex Vif-mediated-degradation-of-APOBEC3G Vpu-mediated-degradation-of-CD4 Regulation-of-activated-PAK-2p34-by-proteasome-mediated-degradation p53-Independent-G1/S-DNA-damage-checkpoint Ubiquitin-Mediated-Degradation-of-Phosphorylated-Cdc25A

## effect size versus statistical significance



s.dist (effect size)

-log(p.adjustIMANOVA) (significance)

#### Termination-of-O-glycan-biosynthesis



Rank in contrast young

## Termination-of-O-glycan-biosynthesis



Rank in contrast young

# Termination-of-O-glycan-biosynthesis



#### Presynaptic-depolarization-and-calcium-channel-openi



Rank in contrast young

## Presynaptic-depolarization-and-calcium-channel-opening



Rank in contrast young

## Presynaptic-depolarization-and-calcium-channe



#### Synaptic-adhesion-like-molecules



Rank in contrast young

5000 0 -5000 -5000 5000 0

Synaptic-adhesion-like-molecules

Rank in contrast young

Rank in contrast old

Synaptic-adhesion-like-molecules



#### Interferon-alpha/beta-signaling



Rank in contrast young

Interferon-alpha/beta-signaling



Rank in contrast young

Interferon-alpha/beta-signaling



#### The-canonical-retinoid-cycle-in-rods-(twilight-vision



Rank in contrast young

## The-canonical-retinoid-cycle-in-rods-(twilight-vision)



Rank in contrast young

The-canonical-retinoid-cycle-in-rods-(twilight-v







Rank in contrast young

## N-glycan-antennae-elongation-in-the-medial/trans-Golgi



Rank in contrast young

N-glycan-antennae-elongation-in-the-medial/tr



#### Chemokine-receptors-bind-chemokines



Rank in contrast young

## Chemokine-receptors-bind-chemokines



Rank in contrast young

## Chemokine-receptors-bind-chemokines



#### O-linked-glycosylation-of-mucins



Rank in contrast young

O-linked-glycosylation-of-mucins



Rank in contrast young

Rank in contrast old

## O-linked-glycosylation-of-mucins



## HS-GAG-biosynthesis



Rank in contrast young

## **HS-GAG-biosynthesis**



Rank in contrast young

## HS-GAG-biosynthesis


#### WNT5A-dependent-internalization-of-FZD2,-FZD5-and-R



Rank in contrast young

### WNT5A-dependent-internalization-of-FZD2,-FZD5-and-ROR2



Rank in contrast young

# WNT5A-dependent-internalization-of-FZD2,-FZ



### **HS-GAG-degradation**



Rank in contrast young

# **HS-GAG-degradation**



Rank in contrast young

# HS-GAG-degradation



#### ediated-transcription-of-oxidative-stress,-metabolic-and-r



Rank in contrast young





Rank in contrast young

FOXO-mediated-transcription-of-oxidative-stres



### Sialic-acid-metabolism



Rank in contrast young

### Sialic-acid-metabolism



Rank in contrast young

# Sialic-acid-metabolism



### Downregulation-of-SMAD2/3:SMAD4-transcriptional-acti



Rank in contrast young

### Downregulation-of-SMAD2/3:SMAD4-transcriptional-activity



Rank in contrast young

Downregulation-of-SMAD2/3:SMAD4-transcripti





Synthesis-of-active-ubiquitin:-roles-of-E1-and-E2-enzy

Rank in contrast young

# Synthesis-of-active-ubiquitin:-roles-of-E1-and-E2-enzymes



Rank in contrast young

Rank in contrast old

# Synthesis-of-active-ubiquitin:-roles-of-E1-and-



Triglyceride-catabolism



Rank in contrast young

# Triglyceride-catabolism



Rank in contrast young

Triglyceride-catabolism



### Ubiquitin-Mediated-Degradation-of-Phosphorylated-Cdc



Rank in contrast young

# Ubiquitin-Mediated-Degradation-of-Phosphorylated-Cdc25A



Rank in contrast young

Ubiquitin-Mediated-Degradation-of-Phosphoryla



### p53-Independent-DNA-Damage-Response



Rank in contrast young



# p53-Independent-DNA-Damage-Response

Rank in contrast young

Rank in contrast old

p53-Independent-DNA-Damage-Response



### p53-Independent-G1/S-DNA-damage-checkpoint



Rank in contrast young

# p53-Independent-G1/S-DNA-damage-checkpoint



Rank in contrast young

p53-Independent-G1/S-DNA-damage-checkpo



#### Assembly-of-the-pre-replicative-complex



Rank in contrast young

# Assembly-of-the-pre-replicative-complex



Rank in contrast young

Assembly-of-the-pre-replicative-complex



### Regulation-of-ornithine-decarboxylase-(ODC)



Rank in contrast young



# Regulation-of-ornithine-decarboxylase-(ODC)

Rank in contrast young

Rank in contrast old

Regulation-of-ornithine-decarboxylase-(ODC)


### Autodegradation-of-the-E3-ubiquitin-ligase-COP1



Rank in contrast young

# Autodegradation-of-the-E3-ubiquitin-ligase-COP1



Rank in contrast young

Autodegradation-of-the-E3-ubiquitin-ligase-CC



## Heparan-sulfate/heparin-(HS-GAG)-metabolism



# 5000 .... 0 -5000 -5000 5000 0

# Heparan-sulfate/heparin-(HS-GAG)-metabolism

Rank in contrast young

Rank in contrast old

# Heparan-sulfate/heparin-(HS-GAG)-metabolism



### Endosomal-Sorting-Complex-Required-For-Transport-(E



## Endosomal-Sorting-Complex-Required-For-Transport-(ESCRT)



Rank in contrast young

Endosomal-Sorting-Complex-Required-For-Tra



### Post-NMDA-receptor-activation-events



## Post-NMDA-receptor-activation-events



Rank in contrast young

# Post-NMDA-receptor-activation-events



**RAB-geranylgeranylation** 



Rank in contrast young

# **RAB-geranylgeranylation**



Rank in contrast young

# RAB-geranylgeranylation



#### **DNA-Replication-Pre-Initiation**



Rank in contrast young

**DNA-Replication-Pre-Initiation** 



Rank in contrast young

**DNA-Replication-Pre-Initiation** 



Stabilization-of-p53



Rank in contrast young

# Stabilization-of-p53



Rank in contrast young

# Stabilization-of-p53



### Smooth-Muscle-Contraction



## Smooth-Muscle-Contraction



Rank in contrast young

# Smooth-Muscle-Contraction



#### Activation-of-the-pre-replicative-complex



#### 5000 2 0 -5000 -5000 5000 0

# Activation-of-the-pre-replicative-complex

Rank in contrast young

Rank in contrast old

Activation-of-the-pre-replicative-complex



### Ubiquitin-dependent-degradation-of-Cyclin-D



# Ubiquitin-dependent-degradation-of-Cyclin-D



Rank in contrast young

Ubiquitin-dependent-degradation-of-Cyclin-D



#### Ilation-of-activated-PAK-2p34-by-proteasome-mediated-d



Rank in contrast young

# Regulation-of-activated-PAK-2p34-by-proteasome-mediated-degradati



Rank in contrast young

Regulation-of-activated-PAK-2p34-by-protease



## **Protein-ubiquitination**



# **Protein-ubiquitination**



Rank in contrast young

# Protein-ubiquitination


### TNFs-bind-their-physiological-receptors





# TNFs-bind-their-physiological-receptors

Rank in contrast young

TNFs-bind-their-physiological-receptors



### AUF1-(hnRNP-D0)-binds-and-destabilizes-mRNA



Rank in contrast young



AUF1-(hnRNP-D0)-binds-and-destabilizes-mRNA

Rank in contrast young

Rank in contrast old

AUF1-(hnRNP-D0)-binds-and-destabilizes-mR



#### Orc1-removal-from-chromatin



Rank in contrast young

Orc1-removal-from-chromatin



Rank in contrast young

Orc1-removal-from-chromatin



### CDT1-association-with-the-CDC6:ORC:origin-comple



### CDT1-association-with-the-CDC6:ORC:origin-complex



Rank in contrast young

CDT1-association-with-the-CDC6:ORC:origin-o



### Cross-presentation-of-soluble-exogenous-antigens-(endos



# Cross-presentation-of-soluble-exogenous-antigens-(endosomes)



Rank in contrast young

Cross-presentation-of-soluble-exogenous-antig



### Intra-Golgi-traffic



# Intra-Golgi-traffic



Rank in contrast young

# Intra-Golgi-traffic



**Regulation-of-Apoptosis** 



Rank in contrast young

**Regulation-of-Apoptosis** 



Rank in contrast young

Regulation-of-Apoptosis



Vpu-mediated-degradation-of-CD4



Vpu-mediated-degradation-of-CD4



Rank in contrast young

Vpu-mediated-degradation-of-CD4



Degradation-of-AXIN



Rank in contrast young

# Degradation-of-AXIN



Rank in contrast young

Degradation-of-AXIN



### Vif-mediated-degradation-of-APOBEC3G



Rank in contrast young



# Vif-mediated-degradation-of-APOBEC3G

Rank in contrast young

Rank in contrast old

Vif-mediated-degradation-of-APOBEC3G





### Class-I-peroxisomal-membrane-protein-import

Rank in contrast young



# Class-I-peroxisomal-membrane-protein-import

Rank in contrast young

Rank in contrast old

Class-I-peroxisomal-membrane-protein-import



Negative-regulation-of-NOTCH4-signaling



Rank in contrast young



# Negative-regulation-of-NOTCH4-signaling

Rank in contrast young

Negative-regulation-of-NOTCH4-signaling






Rank in contrast young



#### SCF-beta-TrCP-mediated-degradation-of-Emi1

Rank in contrast young

SCF-beta-TrCP-mediated-degradation-of-Emi<sup>2</sup>



**DARPP-32-events** 



Rank in contrast young

#### **DARPP-32-events**



Rank in contrast young

## DARPP-32-events



#### Regulation-of-RUNX3-expression-and-activity



Rank in contrast young

### Regulation-of-RUNX3-expression-and-activity



Rank in contrast young

# Regulation-of-RUNX3-expression-and-activity







Rank in contrast young



-glycan-precursor-(dolichol-lipid-linked-oligosaccharide,-LLO)-and-trar

Rank in contrast young

Biosynthesis-of-the-N-glycan-precursor-(dolich



The-role-of-GTSE1-in-G2/M-progression-after-G2-check



Rank in contrast young

#### The-role-of-GTSE1-in-G2/M-progression-after-G2-checkpoint



Rank in contrast young

The-role-of-GTSE1-in-G2/M-progression-after

