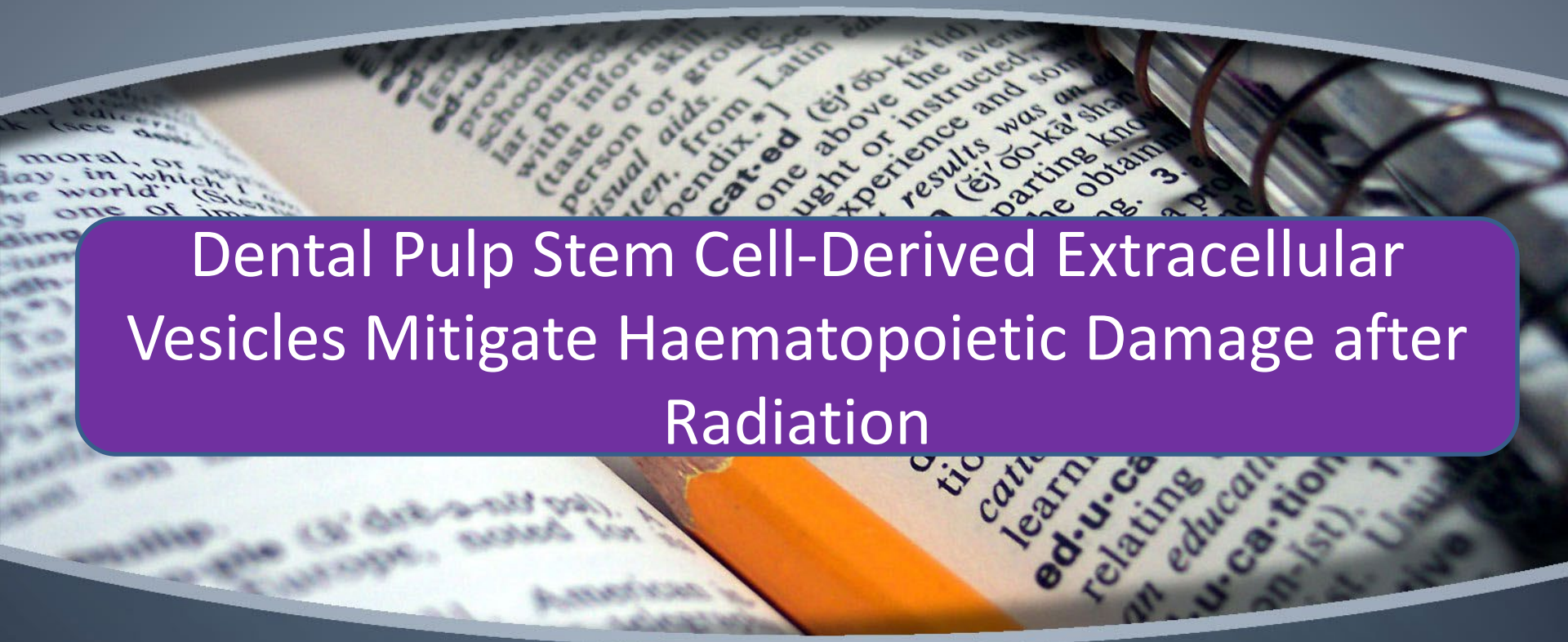


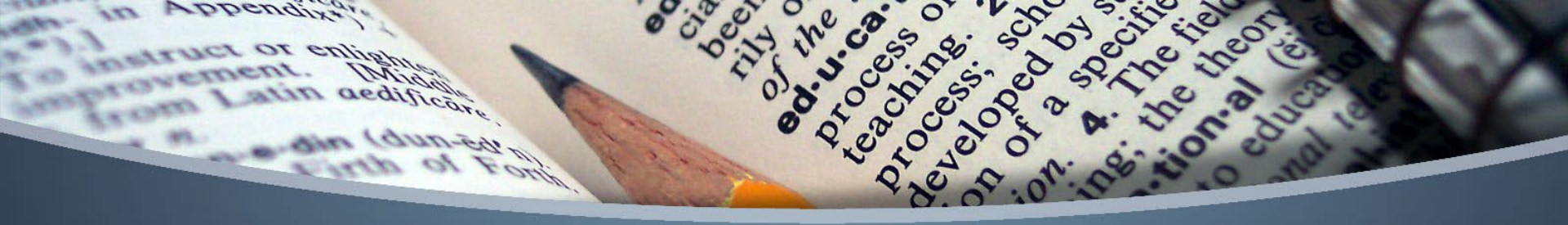
Dental Pulp Stem Cell-Derived Extracellular Vesicles Mitigate Haematopoietic Damage after Radiation

Advisor : Dr.Farsinejad
Presented by : Zahra yousefi
z.yousefi74156@gmail.com

Stem Cell Reviews and Reports

Editorial board | Aims & scope | Journal updates

Stem Cell Reviews and Reports (SCRR) covers contemporary and emerging areas in stem cells by publication of reviews, original data reports (full reports and short reports), protocols, novel hypotheses and commentaries. The scope related to stem cells is broad and includes topics in stem cell biology covering basic, clinical, biotechnology, regulatory, and ethical aspects of embryonic and adult stem cells, induced pluripotent stem cells, fate choice, specific lineage and cloning issues, translational studies, and diseases where stem cell anomalies play a key role and related matters. Original articles are expected to



Introduction

- haematopoietic stem cells (HSCs) are more sensitive to IR
- Over 100 cGy of total body irradiation (TBI) can affect the severity and duration of bone marrow suppression

In this study,we sought to identify whether DPSCs-derived EVs (DPSCs-EVs) could mitigate haematopoietic damage after radiation.

Methods

- cells
- Isolation and Characterization of Extracellular Vesicles
- Flow Cytometry Analysis
- Animals
- Haematopoietic Progenitor Cell Assays and Transplantation Assays
- Apoptosis Assay
- Cell Proliferation Assay

Results

- EV Isolation and Characterization

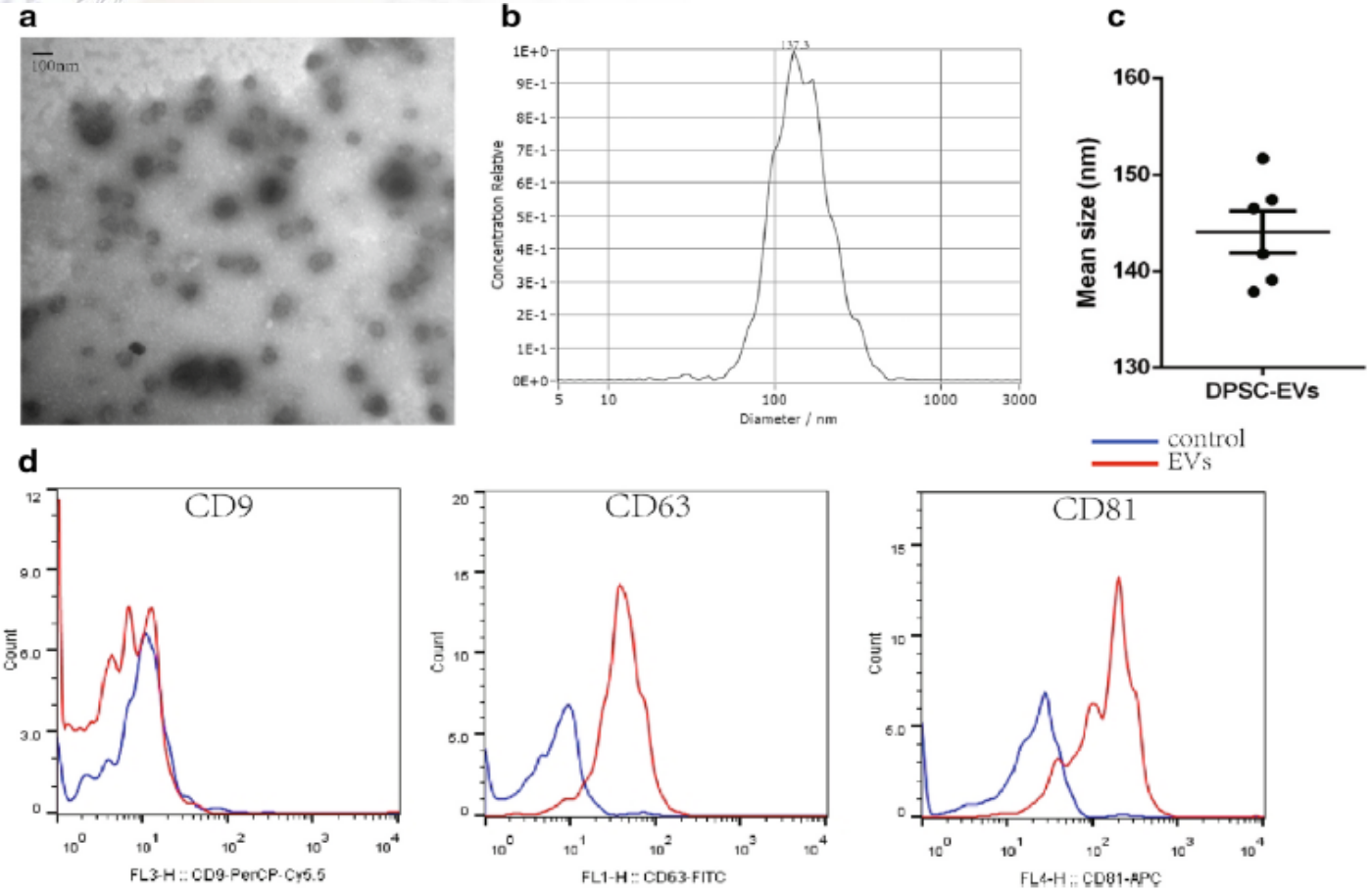


Fig. 1 Characterization of dental pulp stem cell-derived extracellular vesicles (EVs). (a). Transmission electron microscopy image of DPSCs-EVs. Scale bar, 100 nm. (b). Left, size distribution profiles for DPSCs-EVs as measured by Nanoparticle Tracking Analysis (ParticleMetrix, Germany). Right, mean size of EVs. The mean size was 144 nm. $N = 6$. (c). Flow cytometry analysis of CD9, CD63, and CD81 on EVs. Data are shown as the means±SEMc

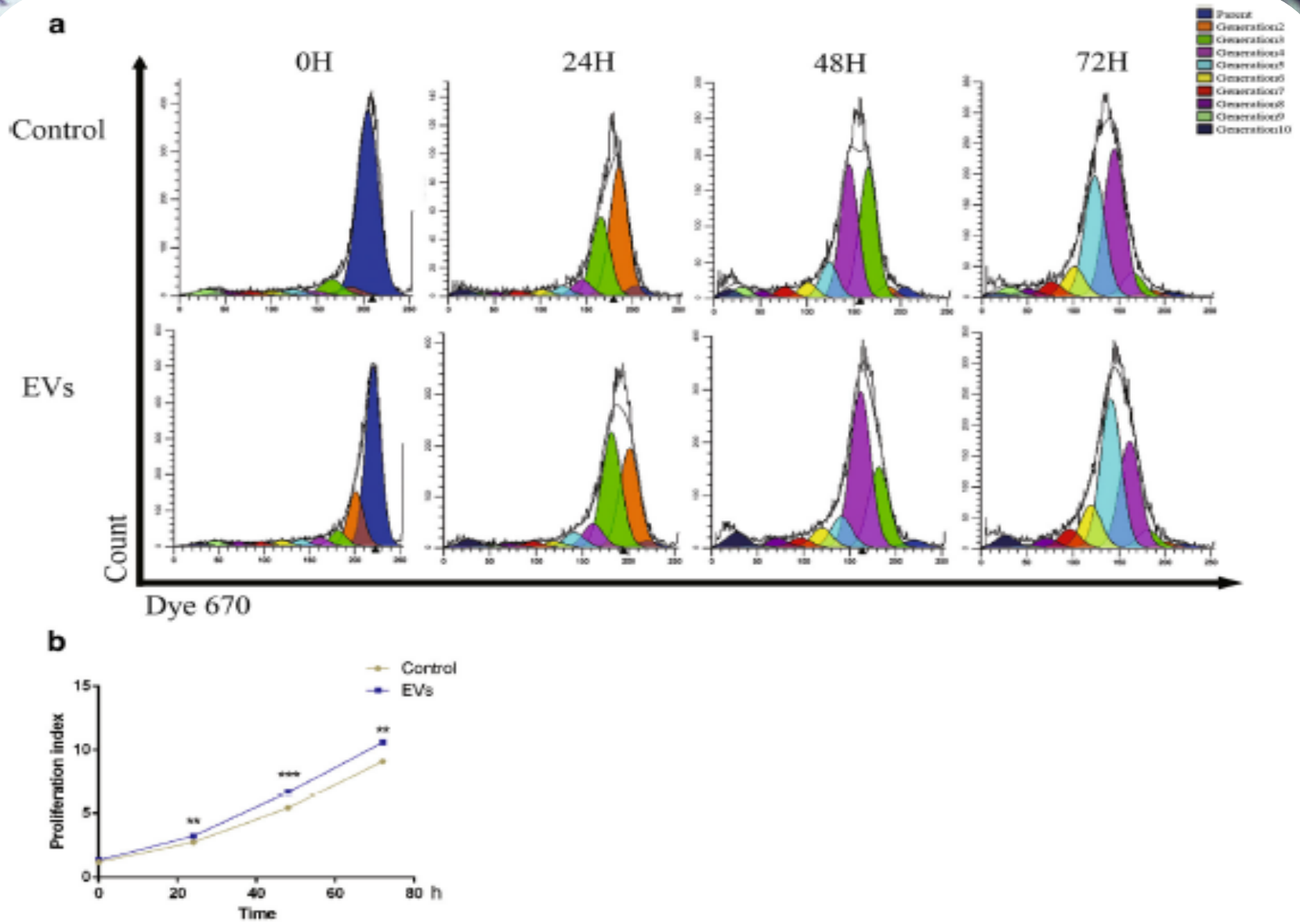
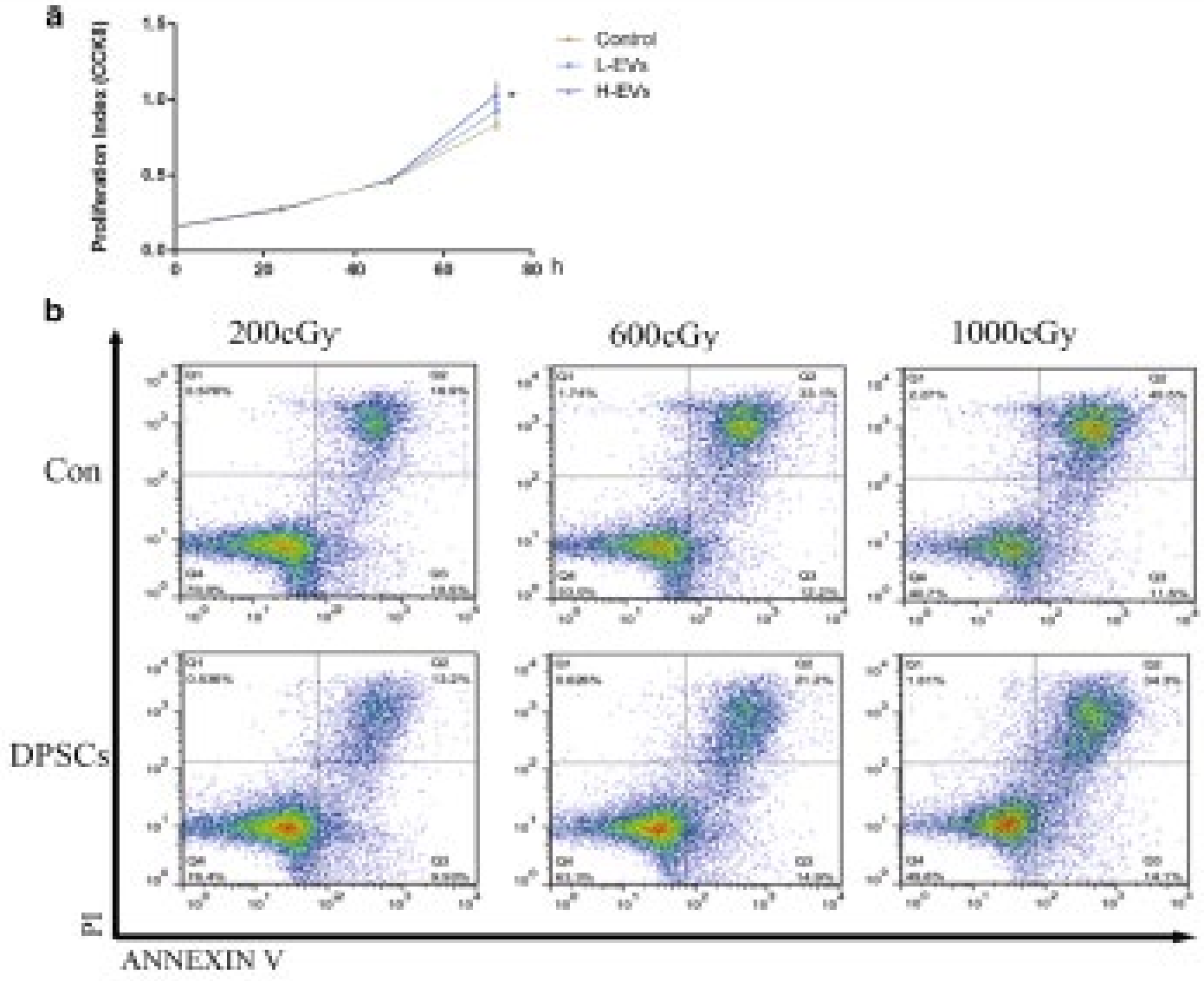
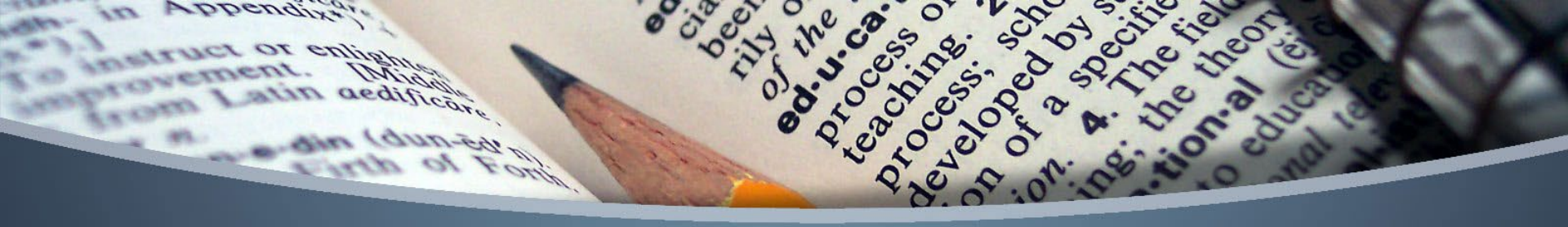
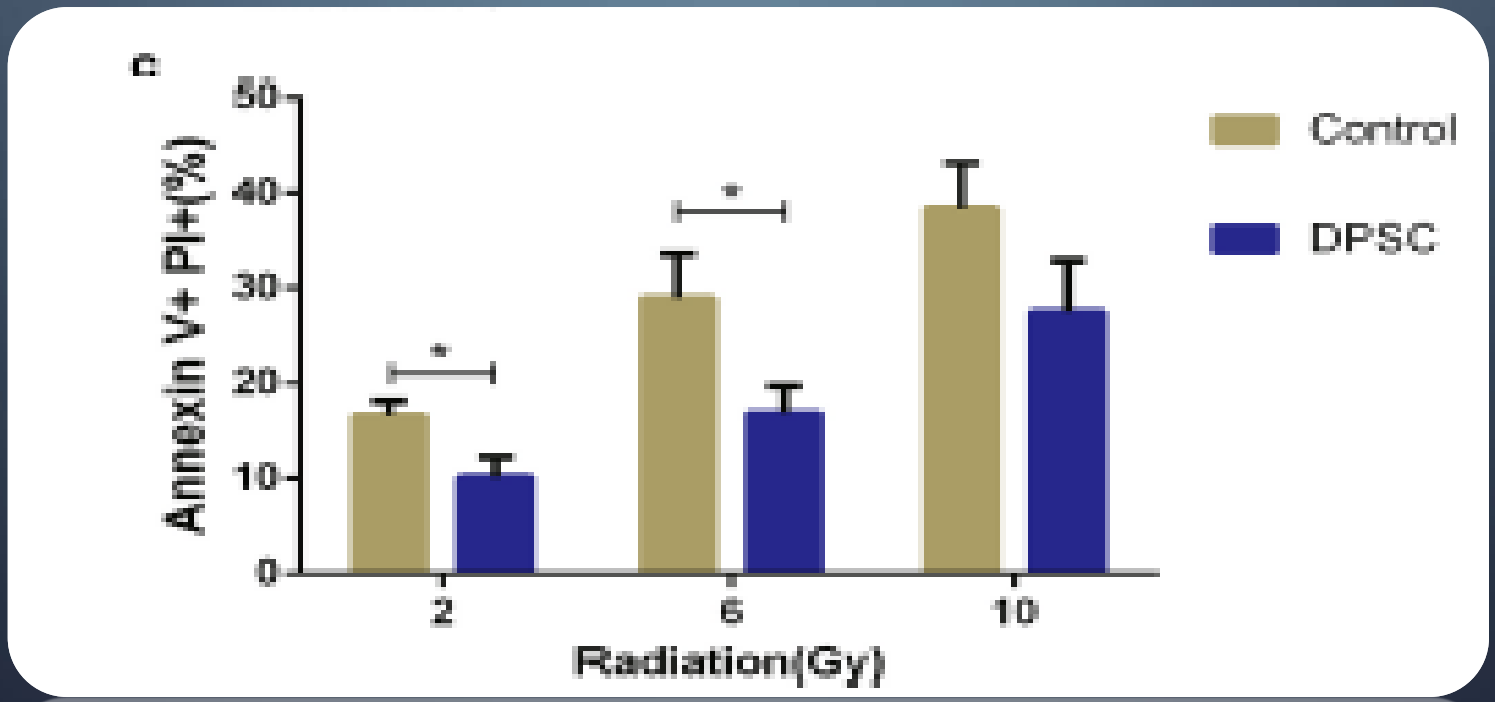
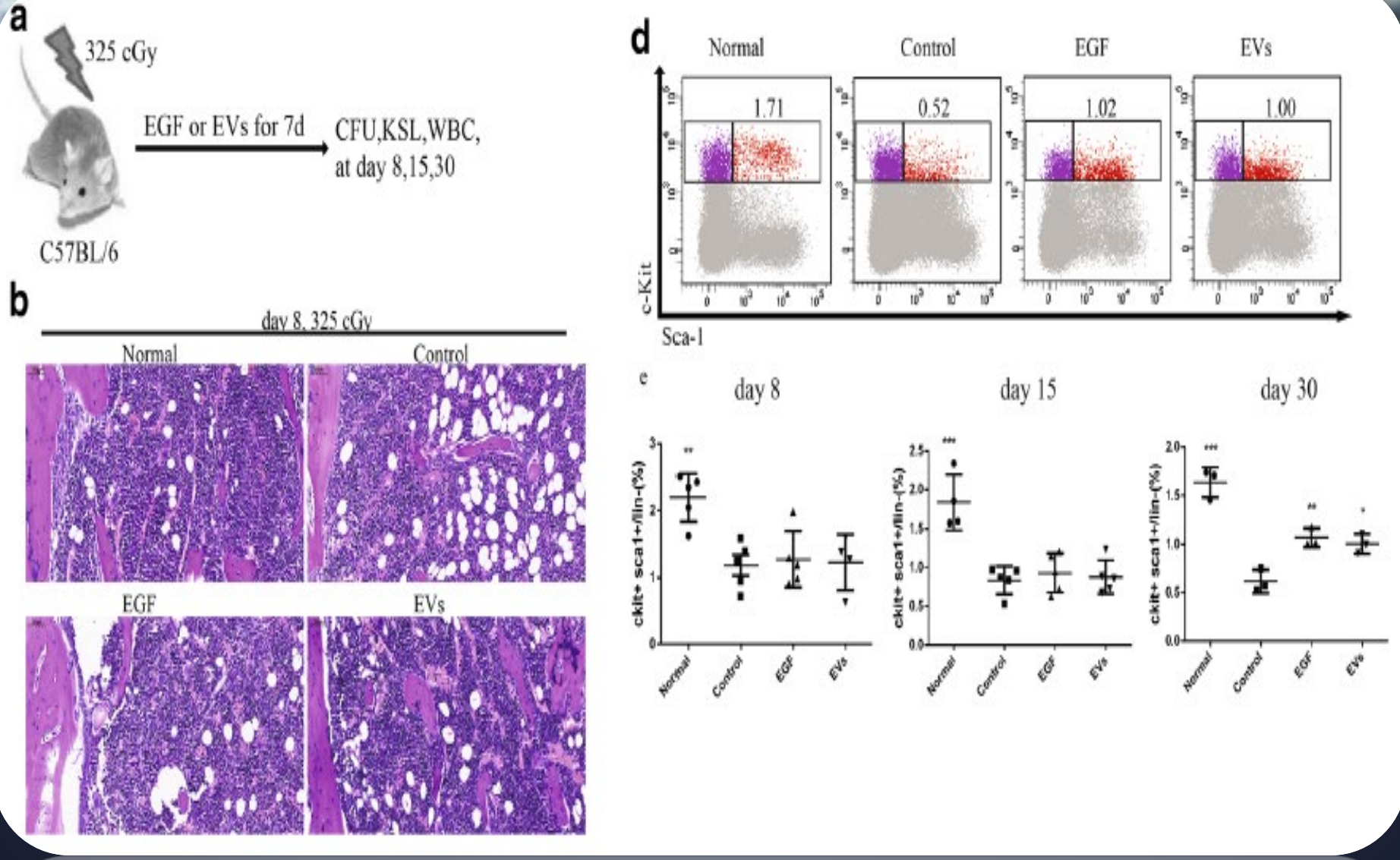


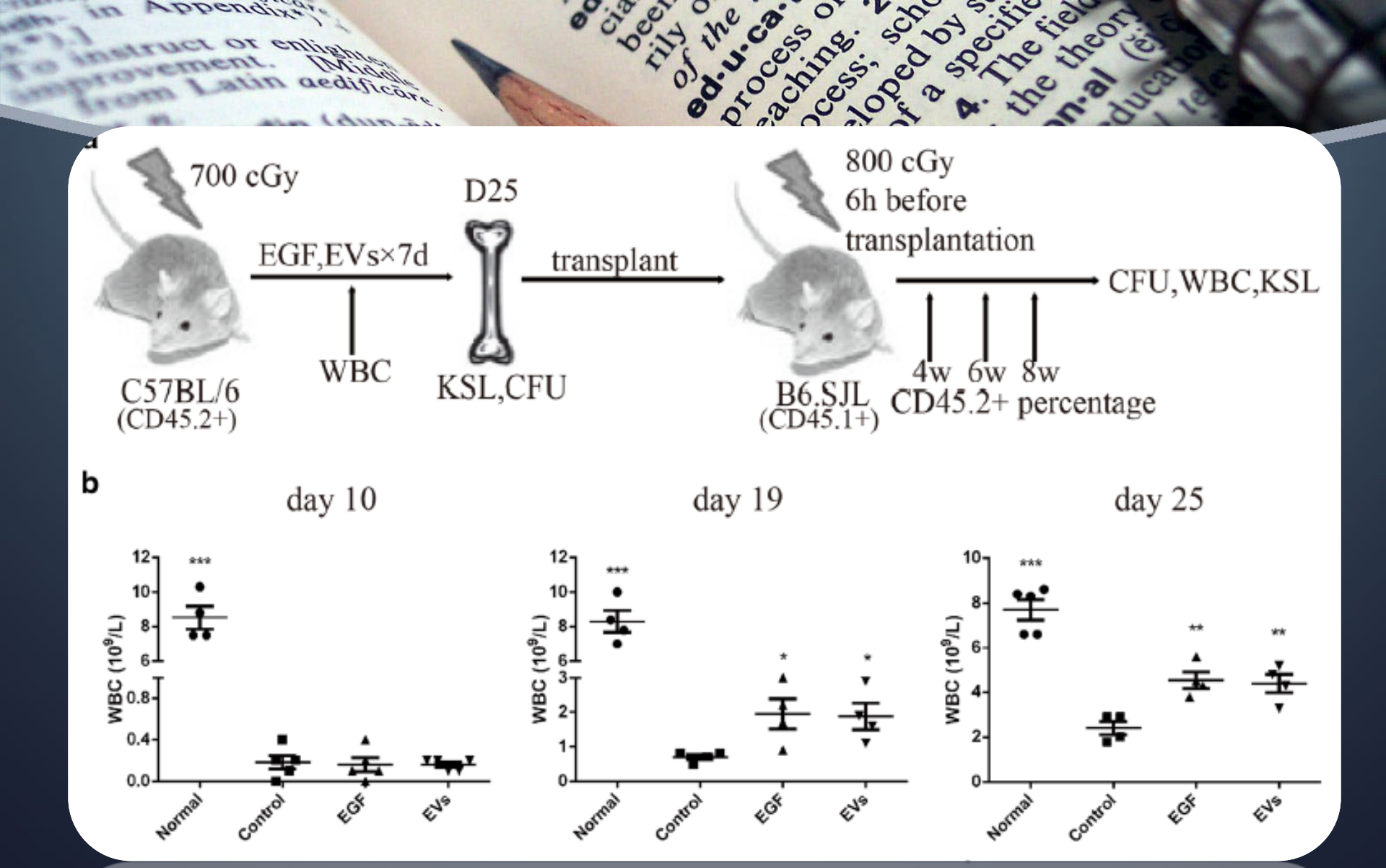
Fig. 2 DPSCs-EVs promoted the proliferation of HUVECs. (**a**). Flow cytometry analysis for proliferation after HUVECs were co-cultured with PBS or EVs. Top: the HUVECs were co-cultured with PBS and the fluorescence intensity of the Dye 670 at 0 h, 24 h, 48 h,72 h after the bind of dye and cell protein. Bottom: the HUVECs were co-cultured with EVs and the fluorescence intensity of the Dye 670 at 0 h, 24 h, 48 h,72 h after the bind of dye and cell protein. The blue bar represented Parent which meant the cells had not divided, the orange bar represented Generation 2 which meant the cells had divided once, the green bar represented Generation 3 which meant the cells had divided twice, and so on. (**b**). Statistical analysis of the control and EVs groups. $N = 3$. $^{**}P < 0.01$, $^{***}P < 0.001$

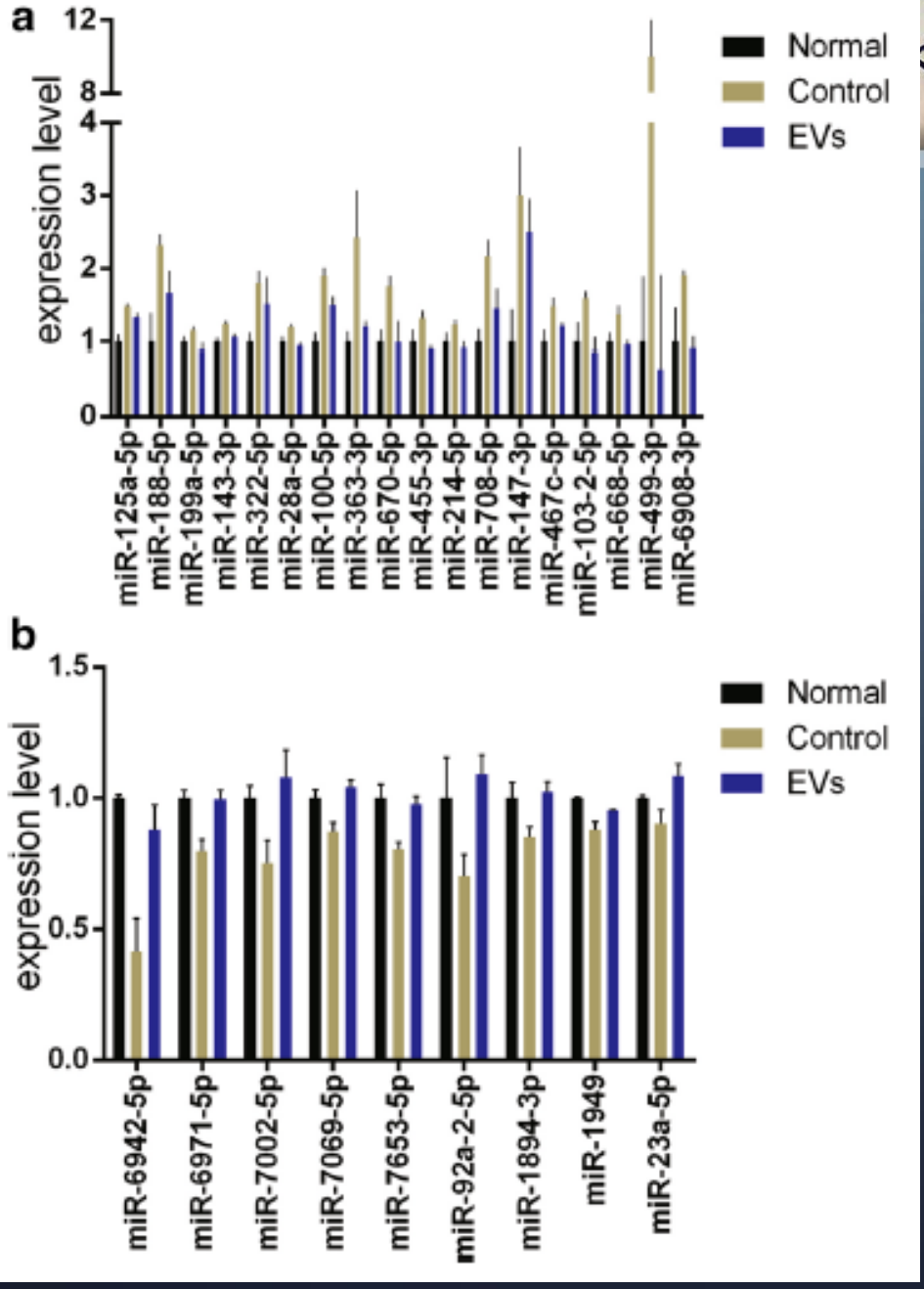

a
Proliferation Index (CCK8)
1.5
1.0
0.5
0.0
0
20
40
60
80 h
Control
L-EVs
H-EVs
b
200cGy
600cGy
1000cGy
Con
DPSCs
PI
ANNEXIN V



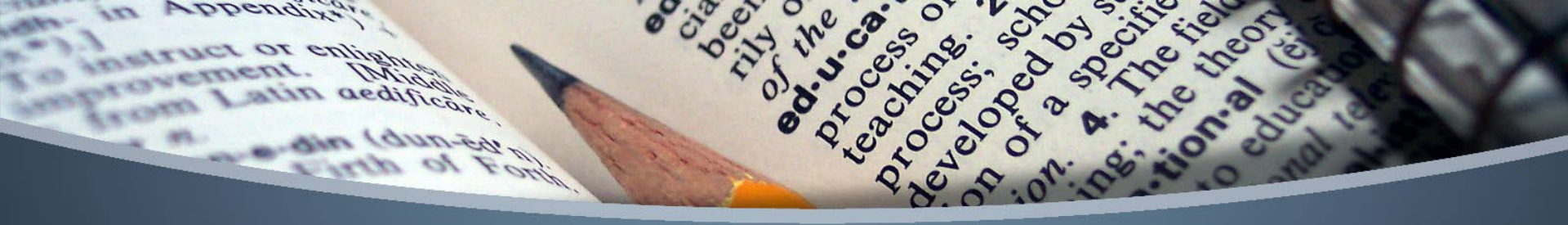



a
325 cGy
EGF or EVs for 7d
CFU,KSL,WBC,
at day 8,15,30
C57BL/6
b
day 8, 325 cGy
Normal
Control
EGF
EVs
d
Normal
Control
EGF
EVs
1.71
0.52
1.02
1.00
c-Kit
Sca-1
e
day 8
day 15
day 30
ckit+ sca1+/lin-(%)
Normal
Control
EGF
EVs


700 cGy
C57BL/6
(CD45.2+)
EGF,EVs×7d
WBC
D25
KSL,CFU
transplant
800 cGy
6h before
transplantation
B6.SJL
(CD45.1+)
4w 6w 8w
CFU,WBC,KSL
CD45.2+ percentage
b
day 10
day 19
day 25
WBC (10⁹/L)
Normal
Control
EGF
EVs



- Some miRNA Expression Changes after the Bone Marrow Cells Being Radiated and EVs Injection



Discussion & Conclusions

- Haematopoietic regeneration
- cell proliferation
- apoptosis inhibition

This is the first report that EVs derived from DPSCs could be used in radiation injury.


Thanks For Your Attention