ORCA – Online Research @ Cardiff

This is an Open Access document downloaded from ORCA, Cardiff University's institutional repository:https://orca.cardiff.ac.uk/id/eprint/124528/

This is the author's version of a work that was submitted to / accepted for publication.

Citation for final published version:

Alraies, Amr , Canetta, Elisabetta, O'Brien-Waddington, Rachel , Moseley, Ryan and Sloan, Alastair 2019. Discrimination of dental pulp stem cell regenerative heterogeneity by single cell raman spectroscopy. Tissue Engineering Part C Methods 25 (8) , pp. 489-499. 10.1089/ten.TEC.2019.0129

Publishers page: http://dx.doi.org/10.1089/ten.TEC.2019.0129

Please note:
Changes made as a result of publishing processes such as copy-editing, formatting and page numbers may not be reflected in this version. For the definitive version of this publication, please refer to the published source. You are advised to consult the publisher's version if you wish to cite this paper.

This version is being made available in accordance with publisher policies. See http://orca.cf.ac.uk/policies.html for usage policies. Copyright and moral rights for publications made available in ORCA are retained by the copyright holders.

FIG. 1

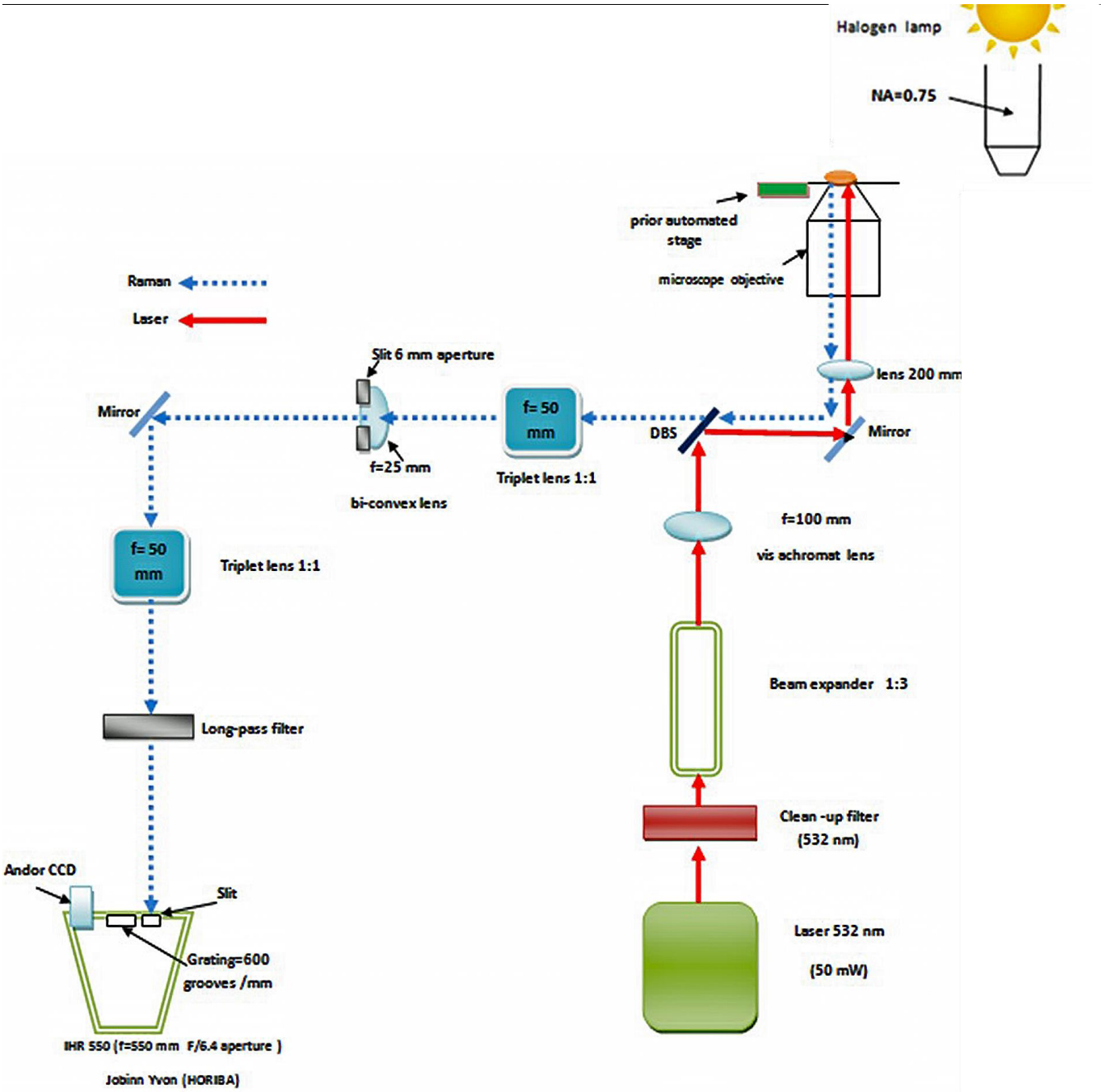

Halogen lamp
NA=0.75
prior automated stage
microscope objective
Raman
Laser
Slit 6 mm aperture
lens 200 mm
Mirror
f= 50 mm
DBS
Mirror
f=25 mm
Triplet lens 1:1
bi-convex lens
f=100 mm
vis achromat lens
f= 50 mm
Triplet lens 1:1
Beam expander 1:3
Long-pass filter
Clean -up filter (532 nm)
Andor CCD
Slit
Laser 532 nm
(50 mW)
Grating=600 grooves /mm
IHR 550 (f=550 mm F/6.4 aperture)
Jobinn Yvon (HORIBA)

FIG. 2

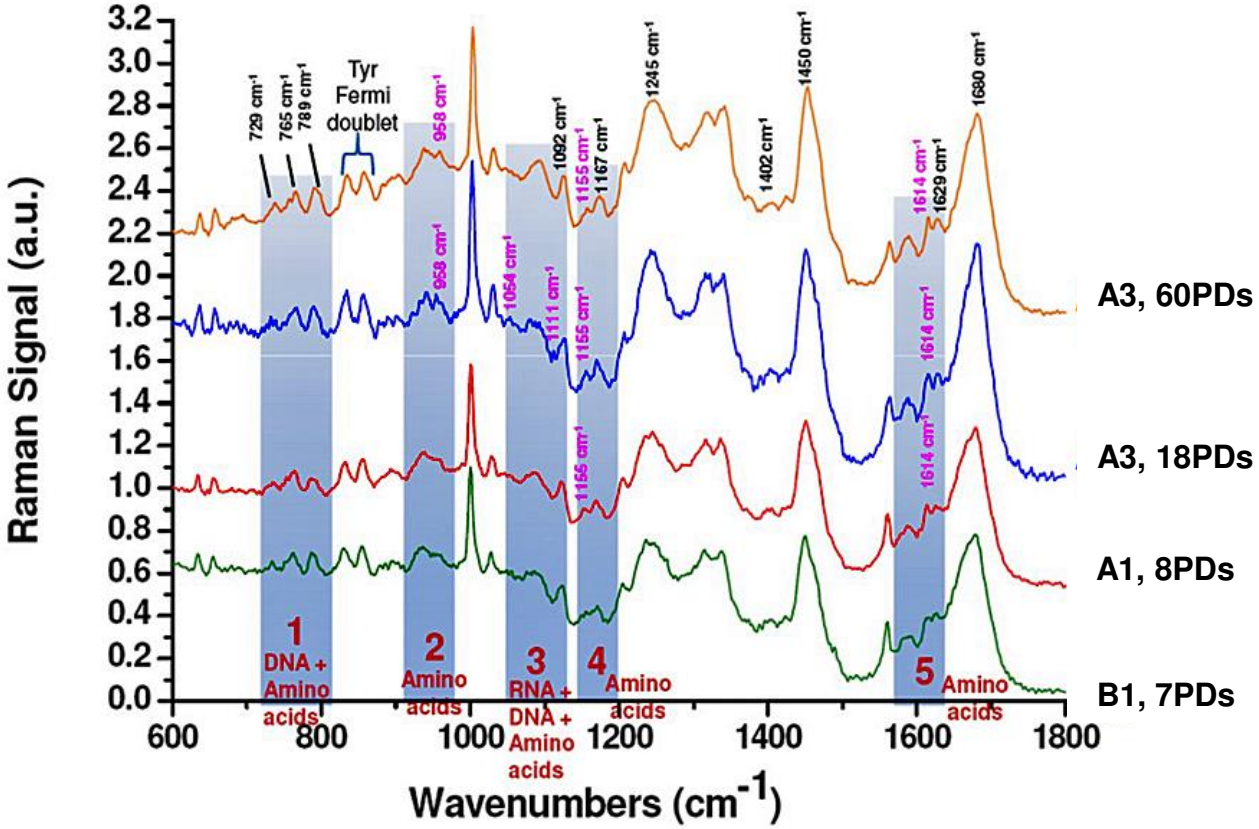

Raman Signal (a.u.)
Wavenumbers (cm-1)
729 cm-1
765 cm-1
789 cm-1
Tyr Fermi doublet
958 cm-1
1092 cm-1
1155 cm-1
1167 cm-1
1245 cm-1
1402 cm-1
1450 cm-1
1614 cm-1
1629 cm-1
1680 cm-1
1054 cm-1
1111 cm-1
1
DNA + Amino acids
2
Amino acids
3
RNA + DNA + Amino acids
4
Amino acids
5
Amino acids
A3, 60PDs
A3, 18PDs
A1, 8PDs
B1, 7PDs

FIG. 3

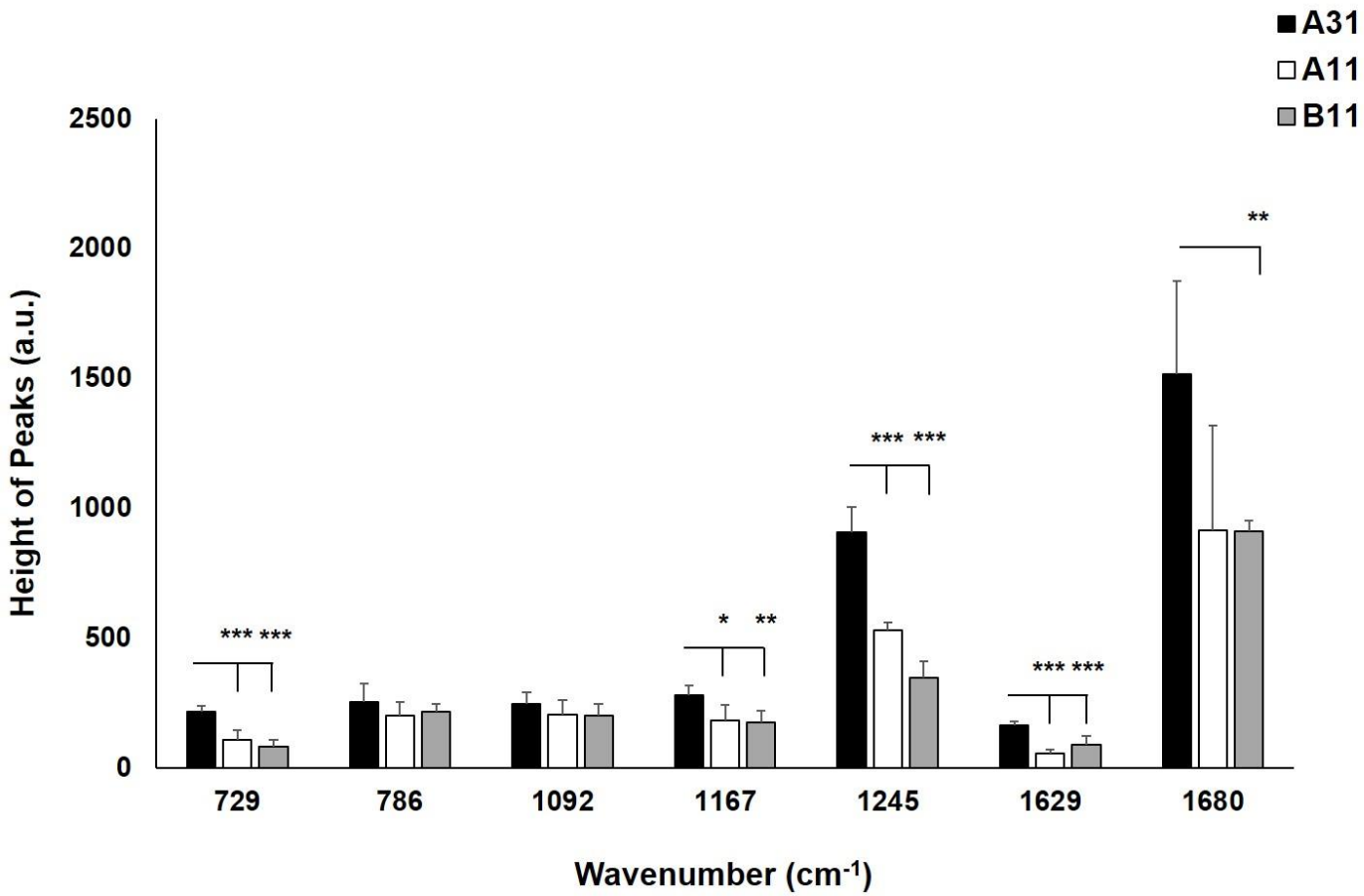
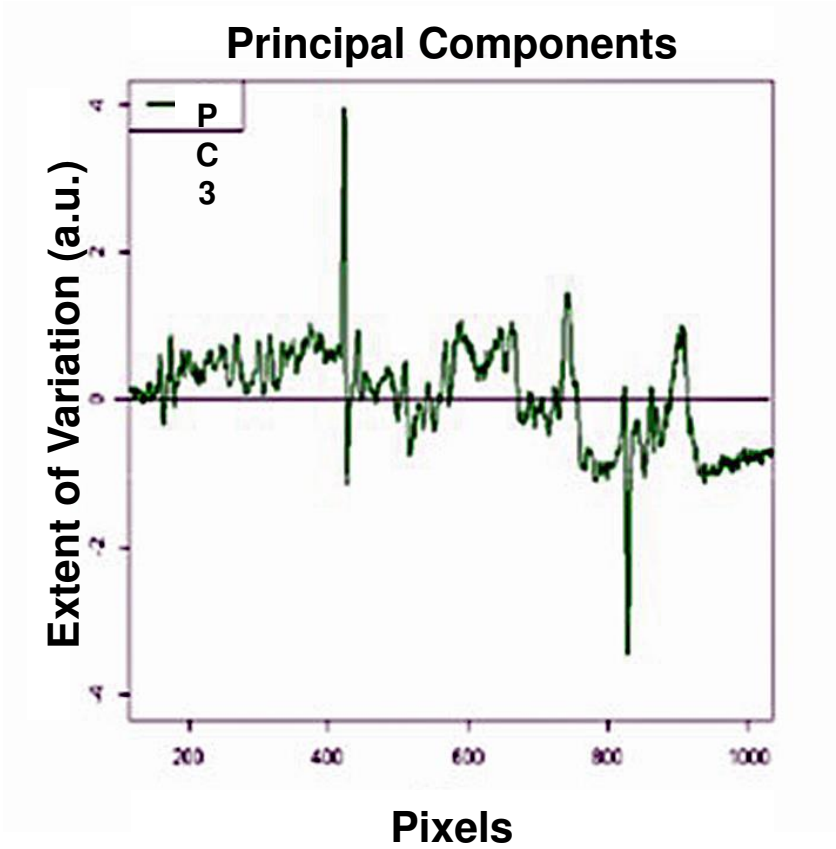

A31
A11
B11
2500
2000
1500
1000
500
0
Height of Peaks (a.u.)
*** ***
* **
*** ***
*** ***
**
729
786
1092
1167
1245
1629
1680
Wavenumber (cm-1)

FIG. 4

A


Principal Components
PC3
Extent of Variation (a.u.)
Pixels
200
400
600
800
1000

B

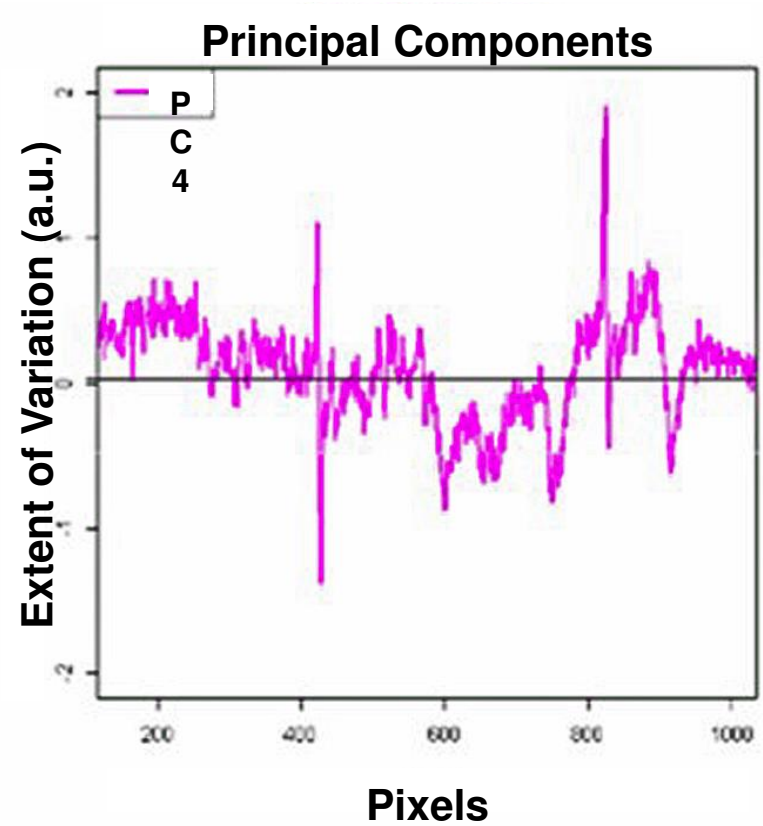
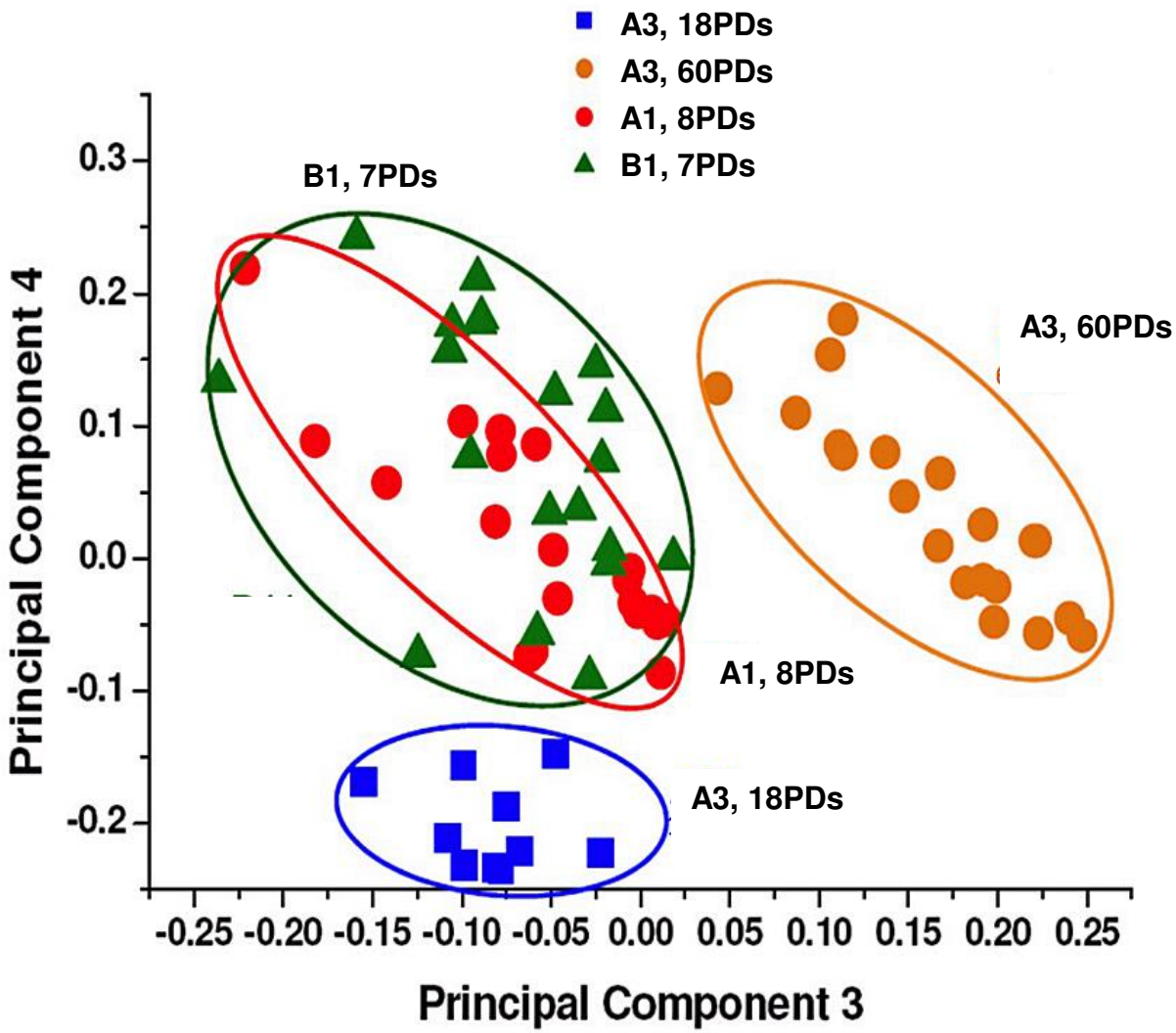

Principal Components
PC4
Extent of Variation (a.u.)
Pixels
200
400
600
800
1000

FIG. 5


A3, 18PDs
A3, 60PDs
A1, 8PDs
B1, 7PDs
B1, 7PDs
A3, 60PDs
A1, 8PDs
A3, 18PDs
0.3
0.2
0.1
0.0
-0.1
-0.2
Principal Component 4
-0.25 -0.20 -0.15 -0.10 -0.05 0.00 0.05 0.10 0.15 0.20 0.25
Principal Component 3