RI GHIURVWLQJ RI WKH VWRUHG FHOOV, DQG XQGHU WKH
RI WKH FHOOV > @

&HOO WR[LFLW\ DVVD\

H FHOO WR[LFLW\ DVVD\ XVHG ZDV SHUIRUPHG DFFRUGLQJ
> @ ,Q EULHI FHOOV ZHUH FXOWXUHG LQ
P/ SHU ZHOO RQWR ZHOO SODWHV &RUQLQJ
DQG LQFXEDWHG IRU DERXW K
IRU P/ RI IUHVK PHGLXP
WR WKH FXOWXUHV IROORZHG E\ LQFXEDWLRQ ZLWK RU ZLWKRXW
DW & XVXDOO\ IRU PLQ 1H[W WKH
WHUPLQDWH WKH FXOWXUH VXSHUQDWDQWV ZHUH FROOHFWHG
PLFURIXJH WXEHV DQG FHQWULIXJHG DW
UHVXOWDQW VXSHUQDWDQWV ZHUH XVHG WR
/'+ DFWLYLW\ DV D F\WRVROLF HQ]\PH PDUNHU
FXOWXUH VXSHUQDWDQW FRUUHVSRQGV WR FHOO GDPDJH > @
SHUIRUPHG E\ XVLQJ DQ /'+ &\WRWR[LFLW\ 7HVW :DNR
&KHPLFDOV 2VDND -DSDQ DFFRUGLQJ WR WKH PDQXIDFWXUHU
$EVRUEDQFH ZDV PHDVXUHG DW QP
XVLQJ D 0XOWLVNDQ 6SHFWUXP
8 6 $ &XOWXUH VXSHUQDWDQWV FROOHFWHG DW
WR GHWHUPLQH WKH EDFNJURXQG UHOHDVH RI /'+
/'+ DFWLYLW\ ZH DGGHG
WR WKH FXOWXUHV RI QRQ WUHDWHG
IRU PLQ DQG WKHQ LQFXEDWHG
IRU FRPSOHWH O\VLV RI WKH FHOOV
WRWDO DFWLYLW\ DFFRUGLQJ WR WKH IROORZLQJ IRUPXOD

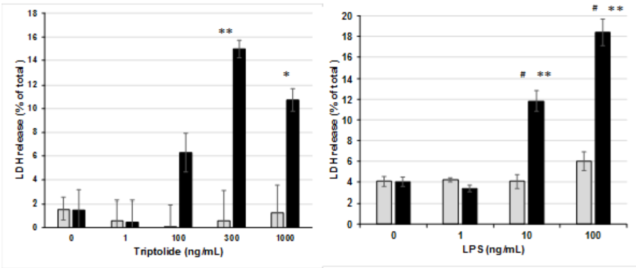
RI WRWDO ^ H[SHULPHQWDO UHOHDVH EDFNJURXQG UHOHDVH WRWDO DFWLYLW\` ™

3UHSDUDWLRQ RI PRXVH SHULWRQHDO PDFURSKDJHV

3UHSDUDWLRQ RI PRXVH SHULWRQHDO PDFURSKDJHV ZDV SHUIRUPHG DV
GHVFULEHG EHIRUH > @ ,Q EULHI IHPDOH
ZHHNV RI DJH ZHUH REWDLQHG IURP -DSDQ 6/&
6KL]XRND -DSDQ
WKH FHUYLFDO YHUWHEUD DQG SHULWRQHDO UHVLGHQW PDFURSKDJHV ZHUH
LPPHGLDWHO\ FROOHFWHG E\ LQMHFWLQJ VWHULOH LFH FROG VDOLQH
3KDUPDFHXWLFDO &R 7RNXVKLPD -DSDQ
IROORZHG E\ PDVVDJLQJ DQG UH FROOHFWLRQ RI WKH VKSHULWRQHDO ZDVKLQJ
~XLGH SHULWRQHDO FHOOV ZHUH ZDVKHG ZLWK
FHQWULIXJDWLRQ DW USP IRU PLQ DQG WKHQ WKH FHOO SHOOHWV ZHUH
VXVSHQGHG LQ LFH FROG P/ RI2 RQ FHOO FRQFHQWUDWLRQ
IRU PLQ IROORZHG E\ WKH DGGLWLRQ RI LFH FROG
UXSWXUH FRQWDPLQDWLQJ
USP IRU PLQ WKH FHOO SHOOHWV ZHUH
FRQWDLQLQJ)%6 DQG
P/ H QXPEHU RI FHOOV ZDV FRXQWHG
WKDW RI WKH FHOOV ZHUH PDFURSKDJHV DV
*LHPVD VWDLQ FHOOV ZHUH VHHGHG RQWR
GHVFULEHG LQ WKH SUHYLRXV VHFWLRQ
FHOOV L H
FHOOV LQFOXGLQJ O\PSKRF\WHV ZHUH
WKH FXOWXUH PHGLXP &\WRWR[LFLW\ DVVD\
DERYH $OO DQLPDO H[SHULPHQWV FRPSOLHG ZLWK WKH DSSURYHG DQLPDO FDUH
SURWRFROV RI WKH 2VDND 8QLYHUVLW\ RI 3KDUPDFHXWLFDO 6FLHQFHV

5HVXOWV

,QGXFWLRQ RI FHOO GDPDJH LQ - ZLWK WULSWROLGH DQG /36



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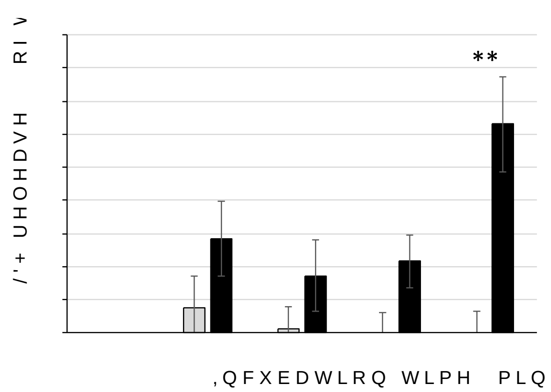
,QGXFWLRQ RI /36 WROHUDQFH WR WKH PDFURSKDJHV WUHDWHG ZLWK /36 DQG

,Q RUGHU WR NQRZ ZKHWKHU WKH FHOO /36 ZDV UHJXODWHG E\ WKH /36 VLJQDOLQJ WROHUDQFH E\ XVLQJ - -$ PDFURSKDJH FHOOV ZLWK RU &RQIRU /36 WR HOLPLQDWH PHWDEROLVP GDPDJH LQGXFHG E\ QJ P/ WULSWROLGH +RZHYHU SUH LQFXEDWLRQ RI WKH FHOOV WKDW WKLV SKHQRPHQRQ VHHPV WR GHSHQG XSRQ WKH FHOO GDPDJH LQGXFHG E\ WULSWROLGH QJ P/)LJXUH % ZHUH UHJXODWHG E\ /36 GHSHQGHQW FHOO GDPDJH ZHUH LQGXFHG

Effects RI WULSWROLGH RQ /36 WUHDWHG & + +H1 DQG & + +H- PLFH

,QGXFWLRQ RI WULSWROLGH GHSHQGHQW FHOO GDPDJH IRU H[DPLQHG E\ XVLQJ UHVSHFWLYHO\ DQG +H DV PLFH LQ RUGHU WR NQRZ ZKHWKHU WKH FHOO GDPDJH GHSHQGV RQ /36 $ GHFUHDVH LQ PDFURSKDJH UHVSRQVH LQ /36 SHUPHDELOLW\ RSWLPDO GRVH RI WULSWROLGH ZDV SULPDU\ IRU QJ P/)LJXUH $ IURP WKDW IRU - -$ PDFURSKDJH FHOOV DIWHU WUHDWPHQW ZLWK WULSWROLGH)LJXUH $ /36 DQG WKRVH IURP & + +H- LQGXFHG FHOO GDPDJH ZDV DOVR REVHUYHG UHSRUWHG SUHYLRXVO\ > @



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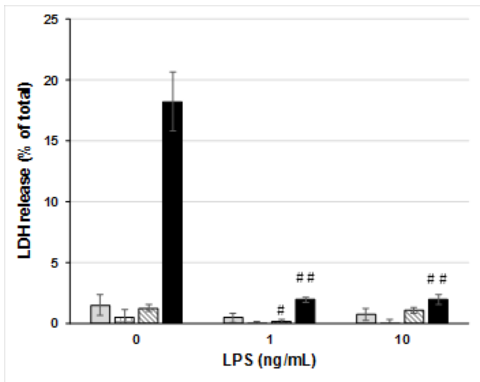

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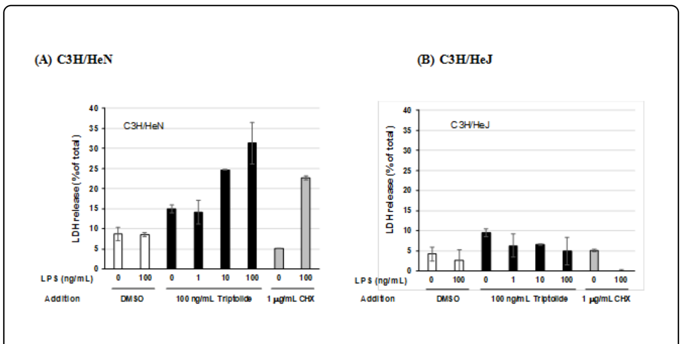

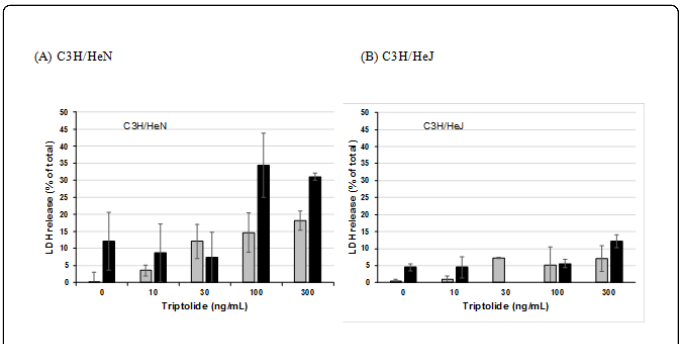

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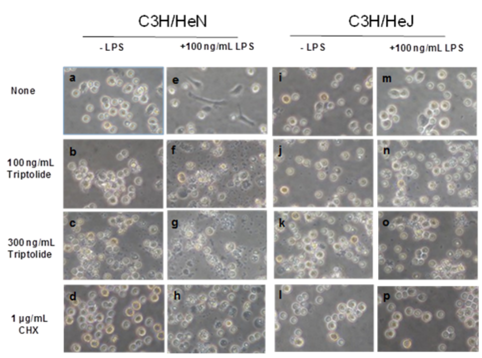

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'LVFXVVLRQ

7ULSWROLGH D GLWHUSHQH WULHSR[LGH D PDMRU FRPSRQHQW RI *7ULSWHU\JLXP ZLOIRUGLL* +RRN I LV NQRZQ DV D &KLQHVH SODQW PHGLFLQH ZLWK PXOWLSOH SKDUPDFRORJLFDO IXQFWLRQV > @ LQFOXGLQJ DQWL LQIODPPDWRU\ DQWL FDQFHU > @ DQG DQWL WXPRU PHWDVWDWLF > @ DFWLYLWLHV :H UHFHQWO\ IRXQG WKDW WULSWROLGH LQGXFHV PDFURSKDJH FHOO GHDWK LQ WKH SUHVHQFH RI EDFWHULDO OLSRSRO\VDFFKDULGH /36 > @ ,Q WKH SUHFHGLQJ VWXG\ XVLQJ FHOOV ZH VKRZHG WKDW WULSWROLGH LQGXFHV VXEVHTXHQW FHOO GDPDJH DFFRPSDQLHG E\ /'+ UHOHDVH LQGXFWLRQ RI 0.3 P51$ DQG SURWHLQ SKRVSKRU\ODWLRQ RI S DQG -1. VXJJHVWLQJ D FRUUHODWLRQ EHWZHHQ WKHPVHOYHV DQG DOVR LPSO\LQJ WKDW ZKLFK SKRVSKDWDVH LV UHVSRQVLEOH IRU FDVFDGH WKDW OHDGV WR VXVWDLQHG SKRVSKRU\ODWLRQ DQG DSRSWRWLF FHOO GHDWK RI PDFURSKDJHV XQGHUO\LQJ WKH LQGXFWLRQ RI WKH F\WRWR[LFLW\ RI PDFURSKDJHV LQ UHODWLRQ WR WKH DFWLRQ RI /36 KDYH EHHQ ODUJHO\ XQNQRZQ

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/36 WROHUDQFH LV NQRZQ WR EH RQH RI WKH PRVW UHPDUNDEOH SKHQRW\SHV RI PDFURSKDJHV DQG LV IRUPDOO\ WKH /36 VLJQDOLQJ FDVFDGH > @ $V WKH SUH FXOWXUH RI - -$ FHOOV ZLWK QJ P/ /36 DW VLJQLILFDQWO\ DOPRVW FRPSOHWHO\ DEROLVKHG WKH FHOO GDPDJH VXEVHTXHQWO\ LQGXFHG E\ QJ P/ WULSWROLGH DQG QJ P/ /36 %HFDXVH QJ P/ /36 IDLOHG WR LQGXFH WKH FHOO GDPDJH LQ FRPELQDWLRQ ZLWK QJ P/ WULSWROLGH)LJXUH % WKH UHVXOWV VXJJHVWHG WKDW WKH FHOO GDPDJH LQ - -$ PDFURSKDJH OLNH FHOOV WKURXJK WKH /36 VLJQDOLQJ FDVFDGH ,W LV QRW FHUWDLQ ZKHWKHU WKLV /36 WROHUDQFH ZDV FDXVHG E\ LQGXFWLRQ RI 0.3 > @ RU QRW DQG WKLV LV DQ LPSRUWDQW SRLQW WR EH DGGUHVVHG LQ WKH IXWXUH

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