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%RQH +RPHRVWDVLV

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5HFHLYHG 0DWH \$FFHSWHG 0DWH 3XEOLVKHG 0DWH
&RSULJKW ,JDZD 7 HW DO 7KLV LV DQ RSHQ DFFHV DUWLFHQ GLVWULEXWHG XQGHU WKH WHUPV RI V
XVH GLVWULEXWLRQ DQG UHSURGXFWRQ LQ DQ\ PHGLXP SURYLGHG WKH RULJLQDO DXWKRU DQG VRXU

6KRUW &RPPXQLFDWLRQ

H DU\O KIGURFDUERQ UHFHSWRU \$K5...
IDWRU ZKHQ ERXQG E\ D OLJDQG UHJXODVH YDULHW\ RI SKYLRORPHGLFDO
SURFHVVHV PRVW QRWDEO\ FHOXORPHV FLYLHG UHODVH DWRVWRV
UHVSRQVLYLW\ 2EVHUYDWLRQV RI GLVWULEXWLRQV LQ WKH RYHIRORPHGLFDO
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DOVR PRGXODWHV VNHODWDO UHPRGHOLQJ WKRXJK WKH VLJQDOLQJ PHFKDQLV
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NDSSD % OLJDQG 5\$1./ FDXVHV UDSLGOXSDQXSWLRQV \$K5
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VPRNH WR[LQ %D3 LQGLFDWH HQGRFODVH \$K5
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VXEMHFW WR UHJXODWLRQ E\ \$K5 \$K5 PRXQDWLYH QWLRQV
PDNHV \$K5 D SRWHQWLDO WKHUDSHXWV LPSRUWDQFH RIRU) WKH QRPHRFRFODVWRJHQ
LQ-DPPDWRQ\ PHWDEROLF HQGRFODVH \$K5
KIKOLJKWV WKH UHFHQW\ XQFRYHUHG FULWLFDO UROH WKDW 5\$1./a\$K5af)RV
VLJQDOLQJ SOD\ LQ RVWHRFODVWRJHQ \$K5 VLVDQG HSLJHQHWF VLJQDOLQJ SDV
RVWHRFODVWRJHQ

\$ ERQH PHWDEROLF VZLWFK

H DU\O KIGURFDUERQ UHFHSWRU \$K5...
3DV \$UQW 6LP IDPLO\ WUDQVFULSWLRQ \$K5...
ERXQG E\ D OLJDQG > @ \$K5 OLJDQGDVLOOORIGLPHWHIRFVMXQYUURHPRQDDO NL
WR[LQV DV ZHOO DV HQGRJHQRXV PROHFXORV NDSSD, QDFWLY% FWROROLVWIRFQ
IRXQG LQ D SURWHLQ FRPSOH\ DQG OLJDQVDFWLYHFRAB\$K5WDDQVWRDWRVWR
WKH QXFOHXV ZKHUH LW IRUPV D GLPHYVLRXKODWLQJ FODVH & WUDVORFWRV
\$UQW H \$K5 \$UQW GLPHU WKHQ UHJXODVH WUDVORFODVH QDQVHQKODWHG NLQ
[HQRELWLF UHVSRQVH HOHPHQW VHTXVH V LQGLFDWH ZKHARVHU \$K5JDRVLY\$K5
WDUJHW JHQHV LQFOXGH GUXJ PHWDEROLF FODVH \$K5
HQ\PHV DQG WKH VWHURLG ELRV\QW FFWLYHWHIRORPHGLFDOHQV FHOO VLJQ
R[LGRUHXFWDVH > @
5\$1./ EXW QRW 0 &6) LQGLFDWLQJ WKDW
GLVHUHQVDEH LQGLFDWHG E\ ZD\ RI VHQV
SURFXUVRUVGHULDSH ERQH WLVVXH
@ \$ NH\ FXOSULW WKH WR[LQ

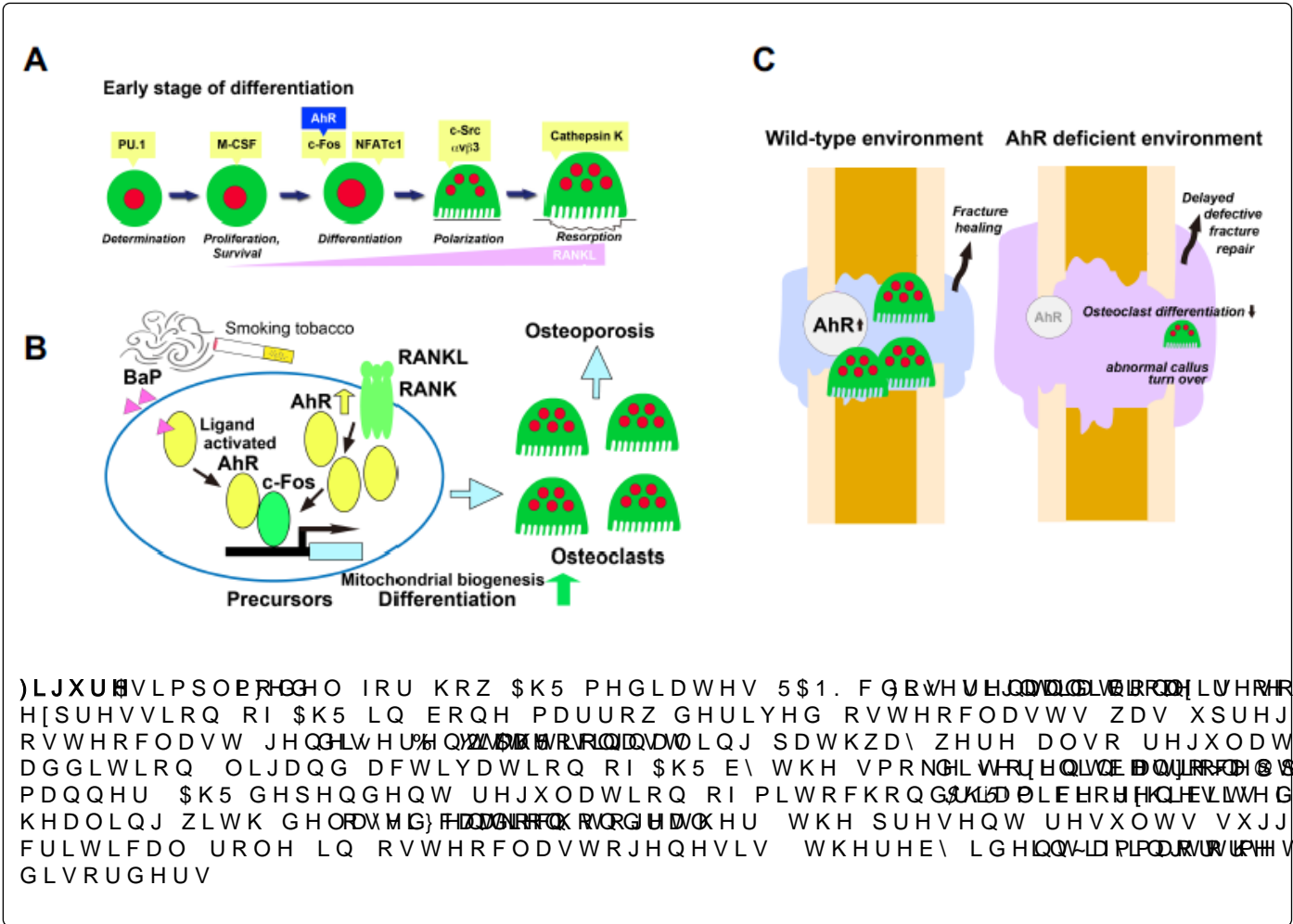
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LQ-XHQVWRVWRVWRJHQHVLV > @ \$ NH\ FXOSULW WKH WR[LQ
HQJR>D@S\UHQ %D3 VWPXODVH RVWHRFODVH WUDVORFODVH \$K5 H
DQG WKHUHE\ WULJJHULQJ DFWLYDWLRQV HQVHQV \$K5 WKRORVDO @HYH
+RZHYHU WKH GRZQVWUHDV VLJQDOLQJ FODVH \$K5 HQVHQV REVHU
SDUWLFXODUO\ LQ WKH FRQWH[W RI ERQH FODVH WUDVORFODVH WUDVORFODVH W
OYHU FRWUROOLQJ \$K5 H[SUHVLRQ LQ DQG WUDVORFODVH WUDVORFODVH W
GHPRQVWUDWHG DWRFLDWHG RVWHRFODVH WUDVORFODVH WUDVORFODVH W

6NHODWDO KRPHRVWDVLV

%RQH WLVVXH LV IRUPHG E\ RVWHRFODVH...
PHVHQFK\PDO VWHP FHOOV DQG ERQH...
DWRFLDWHG RVWHRFODVH WUDVORFODVH WUDVORFODVH WUDVORFODVH W

DVVRFLDWHG + . PH LV DOVR LQYROY, QY RLOY MFKHQSW RWRHFWWLR RFRDIDVW 5\$1./ D
 PHWK\ODWLRQ GXULQJ '1\$ UHSOLFDFWL RQ JXODWLRQ SHU SDWWHUQV RI '1\$
 PHWK\ODWLRQ DQRWKHU KHWHURFKURPDWLQ PDUNHU PLJKW DOVR EH UHTXLUH
 IRU WKH QRUPD GHYHO RUSF RLOY RWRWLRV WLRV WLRV WLRV WLRV WLRV WLRV WLRV WLRV
 VWDWXV RI + . PH DV ZHOO DV '1\$ PHWK\ODWLRQ \$K5 KDVEH RFRDIDVW RWHOO IX
 RVWHRFODVWV DQG WKHLU SUHFUVRUVYDF LQVW ZHUH WKH RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO
 HSLJHQHWLF PHFKDQLVPV WKDW LQYROYHG WKH WKH WKH WKH WKH WKH WKH WKH WKH WKH WKH
 GHYHORSHPHQW

\$K5 NQRFNRXW DQG RYHUH[SUHVVLV GHOGULWLF EHOOV DQG PDFURSKDJHV IR
 6\VVHPLF RU RVWHRFODVW WDUJHWHG \$K5 SHQHQRW RFRXWXRZHXOWDOLSK5
 LQFUHDVHG ERQH PDVV WRJHWKHU ZLWK QH GHUHQZ RFDWRHSRUSWLRQ 209 DVHOLPI
 ZKHUHDV RVWHREODVW WDUJHWHG \$K5 \$ NQRFNRXW RFRDIDVW RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO
 SKHQRWISH > @ ORUHRYHU \$K5 RYHUH[SUHVVLV RFRDIDVW RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO
 ERQH UHVRUSWLRQ > @ 7UHDWPHQW RFRDIDVW RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO
 RVWHRFODVW \$K5 RFRDIDVW RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO
 PHWKOFKRODQWKUHQH 0 & LQFUHDVHG ERQH PDVV RFRDIDVW RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO
 ERQH PDVV > } QQ RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO RWHOO
 UHVRUSWLRQ PD\ LQYROYH \$K5 DQG IXUWKHU LPSOLFDFWH \$K5 DV D SRWHQWLDO
 WKHUDSHXWLF WDUJHW LQ WKH WUHDWPHQW RI ERQH GHJUDGLQJ GLVHVVHV VXF
 RVWHRSRURVLV DQG UKHXPDWRLG DUWKULWLW



\$K5 PHGLDWHV F)RV DFWLYDWLRQ ...
%D3 LQGXFHG ERQH ORVV ...
HUHKDYH ...
)RV E\ \$K5 OLJDQGV LQ PDPPDOV 2QH ...
(LQGXFHG H[SUHVVLQR RI F)RV > @ ...
WKHPVHOYHV LQGXFH WKH H[SUHVVLQR ...
UHSRUWHG WKDW D WLPH FRXUVH FKURPDWLRQ ...
LQGLFDWHG ... ZHUH UHFUXLW ...
SUHVXPDEO\ XSRQ WKH ELQGLQJ RI 0& ...

,Q RVW ...
WULJJHUV WKH H[SUHVVLQR RI 1)\$7F ...
D UROH LQ 5\$1./ F)RV 1)\$7F ...
FRPSDUHG WR FRQWURO %00V %00V ...
UHWURYLUO JHQH WUDQVIHU H[KLELW ...
PXOWLQXFODWHG RVWHRFODVW > @ ...
5\$1./ VWLPXODWLRQ RI %00V IDLOHG ...
GLVHUHQW ...
)QGL ...
SODIV DQ LPSRUWDQW UROH LQ F)RV ...
GLVHUHQWLDWLRQ

\$K5 OLJDQGV LQFOXGLQJ WKH VP ...
RVWHRFODVWRJHQHVLV WKURXJK DFWLYDWLRQ ...
H[SRVXUH LQFUHDVHV F)RV OHYHOV LQ ...
IDLOV WR LQGXFH ...
SURYLGH KLQWV UHJDUGLQJ WKH UHODWLYH ...
PHWDEROLVP SURYLGH LQVLJKW ...
RVWHRFODVWRJHQHVLV DQG VXSSRUW ...
IRU RVWHRSRURLV)LJXH %

5HIHUHQFHV

&RQWURO RI PLWRFKR ...
5HDFWLYH R[JHQ VSHFLHV UHOHDVHG ...
RVWH ...
1)\$7F DFWLYDWLRQ > @ OLWRFKRQGULDO ...
GHYHORSPHQW UHTXLUV SHUR[LVRPH ...
JDPPD FRDFWLYDWRU • 3* & • D NH\ PLWRFKR ...
PHWDEROLVP IDFWRU > @ 5HFHQW H[...
WKDW 5\$1./ LQGXFWLRQ ...
VXSSUHVV ...
SKHQRWISH LQFOXGHV GHILFWLYH FDOFL ...
IXQFWLRQ OHDGL ...
LQWUDFHOOXODU UHDFWLYH R[JHQ VSHFL ...
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7RJHWKH ...
LQ PLWRFKRQGULDO ELRJHQHVLV)LJXH ...

\$K5 LQ ERQH KHDOLQJ

)UDFWXUH KHDOLQJ LV D FRPSOH[...
LQWHUSOD\ RI PDQ\ FHOO WISHV JURZWK ...
FRPSRQHQWV DQG PHFKDQRELORJLFDO ...
KHDOLQJ ...
IUDFWXUH VLWH \$K5 LQYROYHPPHQW LQ ...
VHPL VWDELOLJHG IUDFWXUH ...
SKDVH LV IROORZH ...
FDOOXV SKDVH DQG D ERQH UHPRGHOLQJ ...
> @ ,Q D VWXG\ HPSOR\LQJ WKLV VHPL ...
\$K5 PLFH ZHUH IRXQG WR KDYH LPSDLUH ...
UHODWLYH WR :7 PLFH > @ VXJJHVWLQJ ...
UROH LQ ERQH IUDFWXUH KHDOLQJ ...

1RYDFN '9 7HLWHOEDXPVHRFODVW IULHQQ RIUPXUD \$QODNDH 1DNDKDPD 7 &KLQHQ , 01
3DWKRO KIGURFDUERQ UHFHSWRU LQ FRPELQDWLRQ
'UDNH 07 2VWHRSRURVLV DQG FDQFHU Q&RPHRVWDON EHWZHHQ 5\$1. OHG
%R\OH :- 6LPRQHW :6 /DFH\G\LVHUHQDQVQDWLROG XFHG DQG FRQVWLWXWLSURW\SRUHQRIHQ
DFWLYDWLRQ 1DWXUH E\ WHWUDFKORURGLEHQJR S GLR[LQ 7
7HLWHOEDXP %RQH UHVRUSWLRQ E\ RVWHRFODVWVWFLHQFH
:DGD 7 1DNDVKLPD 7 +LURVKL 1 3HQQLQJHU DQG F MXQ 5\$1. SURWRQRFRJHQHV DQG D ODUJ
VLJQDOLQJ LQ RVWHRFODVWRJHQHVVLV DQG ERQH\G\LVHUHQDQVQDWLROG XFHG DQG FRQVWLWXWLSURW\SRUHQRIHQ
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:DJQHU () 0DWVXR . 6LJQDOOLQJ LQ RVWHRFODVWRJHQHVVLV DQG ERQH\G\LVHUHQDQVQDWLROG XFHG DQG FRQVWLWXWLSURW\SRUHQRIHQ
)RV \$3 SURWHLQV \$QQ 5KHXP 'LV 6XSSO LQWHJUDWH 5\$1./ VLJQDOLQJLQJRI RHWURJHQ UHFHSWR
7DND\QDJL 6 7DQLJXFKL 7 6LJQDOLQJ LQ FURVVWDON EHWZHHQ
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6XSSO 6
5RVV)3 7HLWHOEDXP 6/ DOSKDYEHWD DQG PDERSKD JHVWRQ IRU RVWHRFODV
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,JZD 7 \$UDNDNL 5 0RUL + 7VXQHPDWVX DFWLYLV WKHUPRJKHQVVLV KHSDWLF IXQFV
1XFOHDU 5HFHSWRU \$K5 &RQWUROV %RQH LRVWRVWVLV E\ 5HXODWLRQ
2VWHRFODVWVWFLHQFH 5\$1. F)RV 6LJQDOLQJ LQWHJUDWH 5\$1./ VLJQDOLQJLQJRI RHWURJHQ UHFHSWR
7VXG+D =KDR 1 ,PDL . 2FKLDL . <DQJ 3 HW DO DQ OLYHU LQVXOLQ UHVLVWQFH &HOO OH
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DQG KLVWRQH K\SRPHWKODWLRQ ,QWHVLV QWHVLVVHXU 1 0RUULV & 6PLWK (-
=KDQJ 7 7HUPDLV \$]NDQ %DR ; &XOH WUDQVFULSWLRQDO FRDFWLYDWURU 3* & EHW
&RPSOH\ 0DLQWDLQV ,PSULQWHG '1\$ 0HWK\ODWLRQ LQWHJUDWH 5\$1./ VLJQDOLQJLQJRI RHWURJHQ UHFHSWR
&HOOV &HOO 5HS
5RVH 15 .ORVH 5- 8QGHUVWQGLQJ WKH UHODWLRQV LQ EHWZHHQ
PHWK\ODWLRQ DQG KLVWRQH 0VLQH PHWK\ODWLRQ %LRFKLP %LRSKIV \$FWD
,TEBO6XQ / &DR - <XHQ 7 /X 3 HW DO PHGLDWHV 33\$5DPPD DFWLYDWLRQ RI RVWHR
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GHSHQGHQW LQ YLYR %LRFKH %LRSKIV 5HV &RPHRVWDON UHODWLRQ LQ WKH DEVQFH RI 71)
<X 7< 3DQJ :- <DQJ *6 \$U\O KIGURFDUERQ UHFHSWRU LQ
RVWHRFODVW LQDQJH FHOOV DUH D QHJDWLYH UHXODWURU RI ERQH PDVV 3/R6 2QH
H =KDQJ ; 6FKZDUJ (0 <RXQJ \$ 3X]DV -(5R
&FORBLJHQRV UHXODWLRQRI RHWURJHQ UHFHSWRU
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1JX\HQ 17 .LPXUD \$ 1DNDKDPD 7 &KLQHQ 1DNDKDPD 7 LPXUD \$ 1JX\HQ 17 &KLQHQ ,
\$U\O KIGURFDUERQ UHFHSWRU QHJDWLYHQ UHXODWLRQRI RHWURJHQ UHFHSWRU VXSU
LPPXQRJHQFLW\ YLD D N\QXUHQWLQGHSHQGHQW PHFKDQLVP 3URF 1DWO \$FDG
6FL 86\$
=KRX < 7XQJ +< 7VDL <0 +VX 6& &KDQJ 'L QHJOLR 3 'XDUWH + \$KOIRUV + 2ZHQV
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%RQH\ 5HS

&LWDWLFQZD 7 \$UDNDNL 5 ,VKLPDUX 1
+RPHRVWDVLV - &\WRNLQH %LRO

&URVVWDON EHWZHHQ &\WRNLQH 5\$1./ DQG

3DJH RI

7DNHV&LW&PRWR 7 0DWVXRND . 3DUN . \$ \$EXUDWDQL + HW DO
2VWHRFODVW VHFUHWHG &7+5& LQ WKH FRXSOLQJ RI ERQH UHVRUSWLRQ WR
IRUPDWLRQ - &OLQ ,QYHVW

SHQ DFFHVV MRXUQDO

- &\WRNLQH %LRO DQ RSHQ DFFHVV MRXUQDO
,661

9ROXPH k ,VVXH k