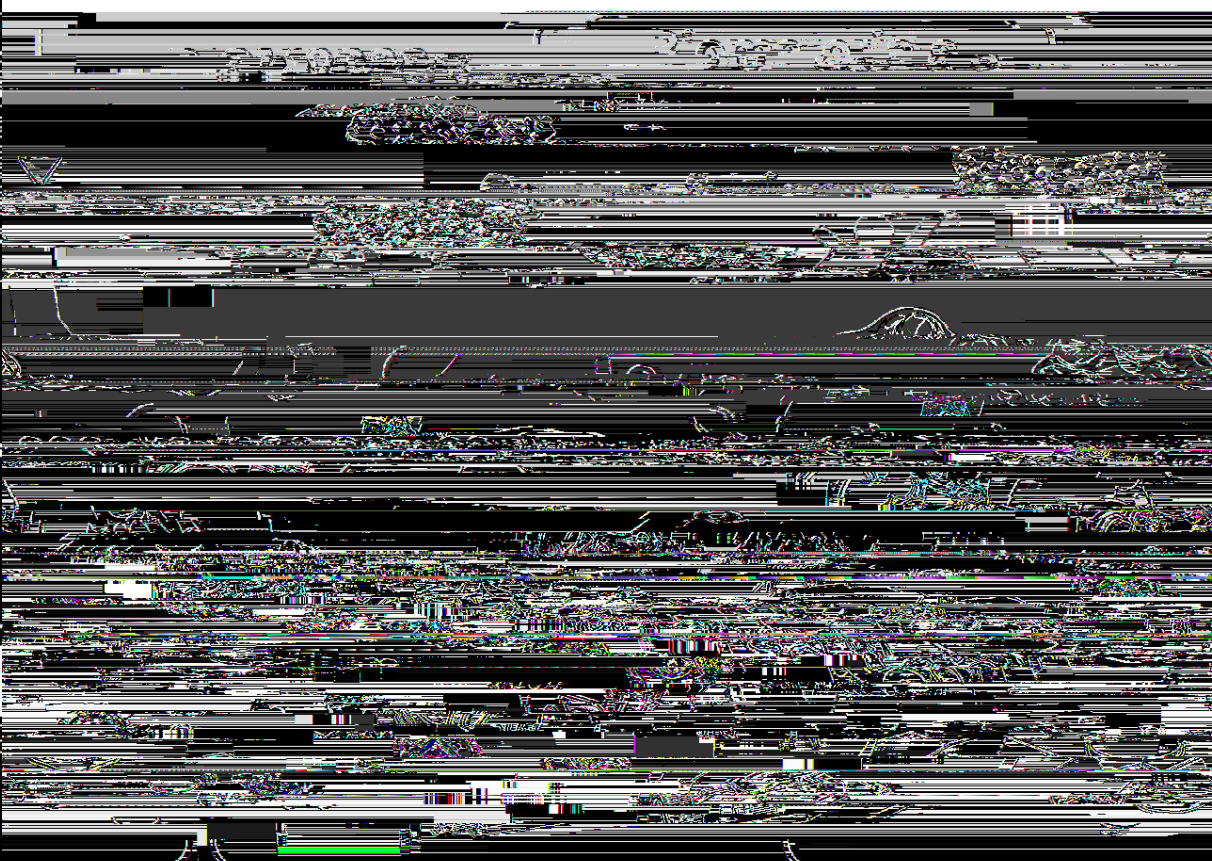


# BIOM9333

7Y`i `Uf`UbX`H]ggi Y`9b[ ]bYYf]b[

HYfa " Z&\$&&





7ci fgY'8YHJ]`g

I b]hg'cZ7fYX]h\*`

Gi a a UfmicZ`hY'7ci fgY

H\]g'W                    ` b g'hY'W    W    hg'cZW                    U YX                    c                    hg' c    'hY'    \Ufa UW

X g f    g    H\]g'W                    ]` W                    'hY' U    g'cZ c    '    c c ]Mg' Y                    c Y




# 5ggYgga Ybh

H\Y'UggYgga Ybfg\Uj Y'VYYb'XYg][ bYX'hc'a YUgi fY'mci f'UWX]Yj Ya YbhcZH\Y''YUfb]b[ 'ci hWca Yg"

E fgVW fe i Za bWad\_ baadk [ fZW i VW] k bdaYdWee fSe] e SdWdWUa\_\_ W VW fa V[eUgee bdaYdWee i [fZ fZW5 agdeW5a` hW adVgd[ Y fZWfWd\_ ž

FZWX S^YdSVWxadfZ[e UagdeWi [^ ad\_ S^k TWTSeW a` fZWeg\_ aXfZWeUadWe Xa\_ W SUZ aXfZW SeeWee\_ W f fSe] ež FZW5 agdeW5a` hW addWeWdWe fZWdYZf fa SV'gef fZWX S^eUadWe Tk eUS↑ Y [XSYdWWW Tk fZW: WSV aXE UZaa ž

5ggYgga Ybhia Uf\_g'UbX'ZYXVUW\_k ]''VY'Uj U]UV'Y'cb'A ccX'Y'Ug'gccb'Ug'hYm\Uj Y'VYYb'a Uf\_YXžk \JWX k ]''i gi U'miVY'k ]h]b'&k YY\_g'cZgi Va ]gg]cb"

5ggYgga YbhUg_	K Y][ \h	8i Y'8UHŸ	7ci fgY'@YUfb]b[ Ci hWca Yg'5ggYggYX
%'7\YW_dc]bhHUg_g	%)	fYZf'hc'Wci fgY'gWXYXi 'Y	%ž&
&"HUg_g	' \$	fYZf'hc'Wci fgY'gWXYXi 'Y	&ž' ž(
' "E i ]hnYg	' \$	fYZf'hc'Wci fgY'gWXYXi 'Y	%ž&ž'
("A Učf'Dfc YWi 	&\$	fYZf'hc'Wci fgY'gWXYXi 'Y	&ž' ž(
) "DYYf'fYj ]yk	)	fYZf'hc'Wci fgY'gWXYXi 'Y	'

5ggYgga Ybh%'7\YW\_dc]bhHUg\_g

8i Y'XUHŸ. fYZf'hc'Wci fgY'gWXYXi 'Y

7\YW\_dc]bhHUg\_g]f] k ]''Ybgi fY'mci 'UFY'\_YYd]b[ 'i d'k ]h'Wcbh'bhVmUbgk Yf]b[ 'U'gYhcZei Yg]cbg'YUWX k YY\_"

5ggYgga Ybh&'HUg\_g

8i Y'XUHŸ. fYZf'hc'Wci fgY'gWXYXi 'Y

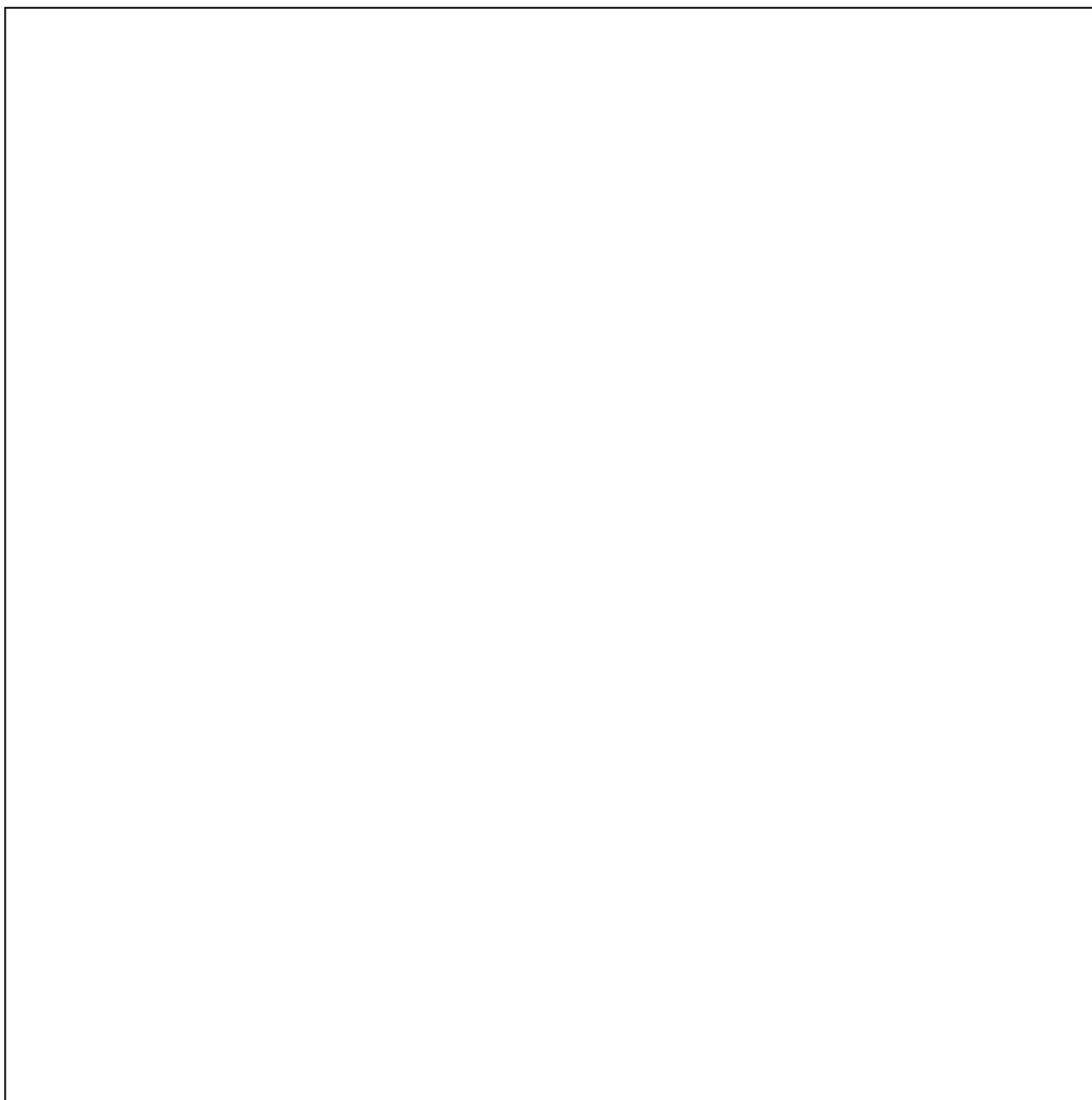
8i Y'XUHY. fYZf'hc'Wci fgY'gVXYXi 'Y

H\Y'a U'ef'dfc'YWhk ]'gYY'mci 'XYg][ b'U'fY[ YbYfUHj Y'a YX]W]bY'dfcXi Whi h']g]b[ 'U'V]cUW]j Y''H\]g'k ]''VY  
UggYggYX'j]b'a i 'hd'Y'dUfhg.'A ]YghcbYg'fl ž% 'YUW]ž'DfcXi Whd]hW]f) i žHYW]b]W]fYdcfhf) i ž'UbX  
F YZYW]cb'f( i ž'

5ggYgga Ybh) . DYYf'fYj ]Yk

8i Y'XUHY. fYZf'hc'Wci fgY'gVXYXi 'Y

DYYf'fYj ]Yk 'cZhY'a U'ef'dfc'YWhd'fcXi Whd]hW]Yg'žca 'chYf'fYUa g'k ]''XYj Y'cd'mci f'W]h]W]fYj ]Yk 'g\_]`g  
UbX'VfcUXYb'i bXYfghUbX]b[ 'cZhY'žY'X'cZfY[ YbYfUHj Y'a YX]W]bY''







		• A U'cf'Dfc'YWhGYggJcb'≡
	5ggYgga Ybh	

# F Ygci fWg

## F YWca a YbXYX`F Ygci fWg

- 5`g\cfh[i ]XY`k`k f]hb[ `UVci hV]c`c[ mž[ `cVU`YX]hcb`Vm>Ub`DYWXYb]\_."

## 7ci fgY`9j U`i Uh]cb`UbX`8Yj Y`cda Ybh

Gh XYbhZYXVUW`Ug`Y`dYX`k`g`UdY`UbX`XYj Y`cd`h]g`Wci fgYž]bWi X]b[ `ZYXVUW`cVU]bYX`Zca`cb!`j]bY`Yj U`i Uh]cbg`Ug`dUfhcZI B GK `g`a m9I dYf]YbW`dfcWgg"

H\Y`Wci fgY`i bXYfk YbhU`a U`cf`fYj ]g]cb`]b`&\$&\$`k ]h`WU]b[ Yg`]bWi X]b[ `fYcfXYf]b[ `cZ`hY`WcbYbh XY`j] YfYXžfYj ]g]cb`h`h`Y`Wci fgY`WcbYbh]bWi g]cb`cZa U`cf`dfc`YWhgYgg]cbg`h`Ugg]ghk ]h`h`Y`h]a Y`m UbX`ZcW`gYX`XYj Y`cda Ybh`cZ`h`Y`a U`cf`dfc`YW`i: cf`h`Y`Z]fgh]a Yž`U`Wci fgY`WcbYbh]g`XYg][ bYX`Zc`f`cb`]bY UWW`gg`k ]h`]bgh]b]hZYXVUW`]bW`f`d`c`f`U`h`X`]b`h`U`Y`gg`c`b`g`UbX`UW]j ]h]Yg": i fh`Y`f`XYj Y`cda Ybh]g`]b`&\$&`\Uj`Y`]bWi XYX`h`Y`]bWi g]cb`cZ`UbXg]cb`UW]j ]h]Yg`]b`gca`Y`k`cf`g`cdg`UbX`fYj ]g]cb`cZ`h`Y`Wci fgY`WcbYbh UbX`UggYgga`Ybh"

DfYj ]ci g`gh XYbh]g`]b`h`Y`WUgg`dfc] ]XYX`ZYXVUW`]bWi X]b[ `H`Wk [ fW`Mef[ Y UagdeWS` V i W`ad`YS` [eW`"ž`FZWSUf]h[f]Wé i W`WW`YSY[ Yf W`akST`W`d`c`g`d`W`Ud[f[US`^fZ[ ] [ Y`S` V i W`Wi W`^ [ fW`d`fW [ fa`fZW`UagdeW"

# Gi Va ]gg]cb'cZ5ggYgga YbhiHUg\_g

@UVcfUhcfmfYdcfng'UbX'a U'cf'Ugg][ ba Ybht'k ]''fYei ]fY'U' [Bcb'D'U\[ \]Uflga '8YWUfUhc'7cj Yf'G\YYH'](#)

5gg][ ba Ybht'g\ci 'X'VY'gi Va ]H'X'cb'h'a Y''5'XU]'mdYbU'micZ) i 'cZhY'a Uf\_g'Uj U]'UV'Y'Zcf'hUh  
Ugg][ ba Ybhk ]''Udd'mZcf'k cf\_'fYW'j YX'UZ'Yf'h'Y'Xi Y'XUH''5bmiUgg][ ba Ybhia cfY'h'Ub') 'XUmg''UH'k ]''bch  
VY'UW'W'dh'X''H\Y'cb'mYI Ya dh]cb'k ]''VY'k \Yb'df]cf'dYfa ]gg]cb'Zcf''UH'gi Va ]gg]cb'\Ug'VYYb'[ fUbh'X'Vm  
h'Y'7ci fgY'W'cfX]bUhc'f''9I h'bg]cbg'k ]''VY'[ fUbh'X'cb'mcb'a YX]W'cf'W'ca dUgg]cbUH' '[ fci bXg'i bXYf  
YI hfYa Y'W'f'W'a g'f'Ub'W'g''

# 5 WUXYa ]W< cbYgmiUbX`D`U[ ]Uf]ga

D@5; =F =GA

6Yk UfY`5b`Ugg][ ba YbhUUh]bWl XYg`d`U[ ]Uf]gYX`a UHf]U`k ]`fYW]j Y`U`\$i : U]žUbX`gh XYbhtg`k \c  
d`U[ ]Uf]gY`a UmZ]j`hY`Wci fgY`Gh XYbhtg`k \c`d`U[ ]Uf]gY`k ]`Uj Y`hY]f`bUa Yg`YbHfYX`cb`U`d`U[ ]Uf]ga  
fY[ ]ghf`UbX`k ]`VY`]UV`Y`hc`X]gW]d`]bUfmiUW]cbž]bWl X]b[ `Yl Wl g]cb`Zca `Ybfc`a`Ybh`  
#]g`Yl dYWYX`hUUhU`gh XYbhtg`a i ghUUhU`h]a Yg`gi Va ]hY]f`ck`b`k`cf`\_`Zcf`UggYgga Ybh`Gi Va ]h]b[ `hY  
k`cf`\_`cf`]XYUg`cZgca YcbY`Y`gY`k ]h]ci hWYUfmiUW\_bck`YX[ ]b[ `hY`gci fW`cZVcffck`YX`a UHf]U`cf`]XYUg`]g  
d`U[ ]Uf]ga "

5`UggYgga Ybhtg`k \]Wl`mci `UbX`]b`a i gh`Uj Y`U`[B`cb`D`U\[ \]Uf\]ga`8YWUfU\]cb`7cj`Yf`G`YYH`H\\]g`\]g`Zcf`  
Vch`\]bX\]j`\]Xi`U`UbX`\[ fci`d`k`cf`\\_`5HUVW`\]h\]c`mci`f`Ugg\]\[ ba YbhVYZcfY`gi Va \]h\]b\[ `\]h\]c`hY`7`ci`fgY`  
7`ccfX\]bUhc`f`cf`UhhY`GVX`cc`C`Z\]W"](#)

D`U[ ]Uf]ga `]g`hY`i`gY`cZUbchYf`dYfgcb`g`k`cf`\_`cf`]XYUg`Ug`]ZhYmik`YfY`mci`f`ck`b`"K` \Yb`]h]g`bYW]ggUfmicf`  
XYg]fUV`Y`hc`i`gY`chYf`dYcd`Y`g`a`UHf]U`mci`g`lci`X`UXYeI`UH`mUW\_bck`YX[ Y`k`l`cgY`k`cfXg`cf`]XYUg`hYm`  
UfY`UbX`k` \YfY`mci`Zci`bX`hY`a`f`]j`]b[ `hY`Wca`d`YH`fYZYfYbW`XYH]`gž]bWl X]b[ `dU[ Y`bi`a`VYffg]H`hY`  
@YUfb]b[ `7`YbHfY`dfcj`]XYg`Z`fH`Yf`]bZcfa`U]cb`cb`k` \UhWcbgh]h`H`g`D`U[ ]Uf]ga `Uh`  
\Hdg`#]gh XYbhtg` bkg`"YXi`"U`#]U[ ]Uf]ga

5WUXYa ]WbZcfa Uh]cb

7CI FG9'9J5@! 5H€B'5B8'89J9@CDA 9BH

Gh XYbhZYXVUW\_\Ug\YdYX'hc'g\UdY'UbX'XYj Y'cd'h\]g'Wci fgYz]bWi X]b[ 'ZYXVUW\_cVHU]bYX'Zca'cb!  
]bY'Yj U'i Uh]cbg'Ug'dUfhcZI BGK 'g'Ug'dUfhcZI BGK 'g'a m9I dYf]YbW'dfcWgg"Mc i 'UfY'\][\`m  
YbWci fU[ YX'hc'Wca d'YH'gi W\ Ub'cb!]bY'Yj U'i Uh]cb'hck UfX'hY'YbX'cZHYfa "': YYXVUW\_UbX'gi [ [ Ygh]cbg  
dfcj ]YX'k ]"VY'ja dcfhUbh]b]ja dfcj ]b[ 'hY'Wci fgY'Zf'Z hi fY'gh XYbtg"

85H9G'HC' BCH9

FYZf'hc'A m BGK 'Zcf'a dcfhUbh8UH'gžUj U]UV'Y'Uh

? Ybg]b[ hcb`Wla di g`lg`cWJHYX"

5ddYbX]l . '9b[ ]bYYfg'5i ghfU`U'f95E'DfcZYgg]cbU`'9b[ ]bYYf'7ca dYhYbWm  
GHUbXUfX

Dfc[ fUa 'hYbXYX'@YUfb]b[ 'Ci hWta Yg	
? bck `YX[ Y'UbX'g_]`VUgY	
D9%"%7 ca dfY\Ybg]j YzhYcfmVUgYX'i bXYfghUbX]b[ 'cZhY'i bXYfd]bb]b[ 'bUh fU`UbX d\mg]WU`gWYbWg'UbX'hY'Yb[ ]bYYf]b[ 'Z bXUa YbH'g'Udd']WUV'Y'hc'hY'Yb[ ]bYYf]b[ 'X]gWd`]bY	
D9%"&'7 cbWdh U`i bXYfghUbX]b[ 'cZhY'a UhYa Uh]Wg'z'bi a Yf]WU`UbU'mg]g'ghUhgh]Wg'z'UbX Wta di h'f'UbX']bZ'fa Uh]cb'gWYbWg'k \]W' i bXYfd]b'hY'Yb[ ]bYYf]b[ 'X]gWd`]bY	
D9%" " 'h!XYdh'i bXYfghUbX]b[ 'cZgdYWU]g'hVcX]Yg'cZ_bck `YX[ Y'k ]h]b'hY'Yb[ ]bYYf]b[ X]gWd`]bY	
D9%"('8]gWfba YbhcZ_bck `YX[ Y'XYj Y`cda YbhUbX'fYgYUfW'X]fYW]cbg'k ]h]b'hY Yb[ ]bYYf]b[ 'X]gWd`]bY	
D9%" ) ? bck `YX[ Y'cZYb[ ]bYYf]b[ 'XYg][ b'dfUW]W'UbX'WcbhYi h U`ZUW'c'fg]a dUW]b[ 'hY Yb[ ]bYYf]b[ 'X]gWd`]bY	
D9%"* 'i bXYfghUbX]b[ 'cZhY'gW'cdY'z'df]bWd`Yg'z'bcfa g'z'UW'W'ci bHUV]']h]Yg'UbX'Vci bXg'cZ gi gh]bUV'Y'Yb[ ]bYYf]b[ 'dfUW]W' ]b'hY'gdYW]ZWX]gWd`]bY	
9b[ ]bYYf]b[ 'Udd']WU]h]cb'UV']]m	
D9%"%5dd`]WU]h]cb'cZYghUV]g\YX'Yb[ ]bYYf]b[ 'a Yh'cXg'hc'Wta d'Yi'Yb[ ]bYYf]b[ 'dfcV'Ya gc'] ]b[	
D9%"&'&'i YbhUdd']WU]h]cb'cZYb[ ]bYYf]b[ 'h'W]b]ei Yg'z'hc'g'UbX'fYgci fW'g	
D9%" " '5dd`]WU]h]cb'cZgmg'hYa Uh]WYb[ ]bYYf]b[ 'gmb'hYg]g'UbX'XYg][ b'dfcW'ggYg	
D9%"('5dd`]WU]h]cb'cZgmg'hYa Uh]WUdd'fcUW'Yg'hc'hY'W'cbXi W'h]UbX'a UbU[ Ya YbhcZYb[ ]bYYf]b[ dfc'YW'g	
DfcZYgg]cbU`UbX'dYfgcbU`Uhf]Vi hYg	
D9' "%9h]WU`W'cbXi W'h]UbX'dfcZYgg]cbU`UW'W'ci bHUV]']]m	
D9' "&'9ZYW]j Y'cfU`UbX'k f]hYb'Wta a i b]WU]h]cb']b'dfcZYgg]cbU`UbX`UmXca U]bg	
D9' " '7fYUh]j Y'z']bbcj Uh]j Y'UbX'dfc!UW]j Y'XYa YUbcif	
D9' "( 'DfcZYgg]cbU`i gY'UbX'a UbU[ Ya YbhcZ]bZ'fa Uh]cb	
D9' ") 'CfXYf'ma UbU[ Ya YbhcZgY'z'UbX'dfcZYgg]cbU`W'cbXi W'h	
D9' "*" '9ZYW]j Y'hYUa 'a Ya VYfg\]d'UbX'hYUa ``YUXYfg\]d	