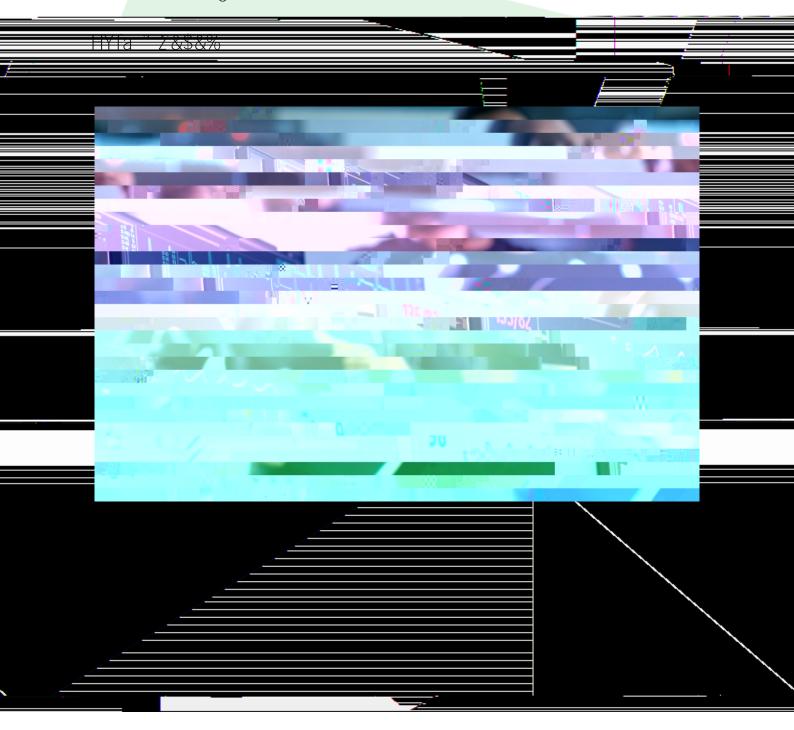


# **BIOM9640**

6]ca YX]WU`]bglfi a YblUljcb



# 7ci fgY<sup>\*</sup>Cj Yfj ]Yk

# GHJZZ:7cbHJWh:8YHJ]`g

## 7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cWJhjcb	D\cbY
8f"*8Uj]X*HgU]	X"hgU]4 i bgk "YXi "Ui	H65	Fa%\$\$'ž@` %z6]cgWYbW Gcih\f9&*Ł	- \$*) `, &' \$

#### @YWhi fYfg

B Ua Y	9a U]`	5j U]`UV]`] <b>m</b>	@cWUhjcb	D\cbY
8f"T`]gYg 5fY[iYHJFcV`Yg	L "5fY[i YHJfcV'Yg4 i bgk "YXi " Ui	H65	Fa‰\$\$‰e ‰6]cgWYbW Gcih\f9&*Ł	
8f"H]Ubfic; ic	ht[ic4 ibgk "YXi "Ui	H65	Fa')%)ž'@j` )ž'GUaiY`g 6i]X]b[ fl&)Ł	

### 8Ya cbglfUhcfg

B Ua Y	9a U]`	5j U]`UV]`]lm	@cWUh]cb	D\cbY
A f"'? Yb[!M]b'@U]	Yb[!m]b"`U]4 i bgk "YXi "Ui	H65	@ ``@ ž GUa i Y`g 6i ]`X]b[ fl &) Ł	
A f"'A ]W\UY` #U`]Ubc	a "]HU`]Ubc4 gh XYbh'i bgk "YXi " Ui	H65	g ``%z 6]cgWJYbW/ Gci h\`f9&*Ł	
8 f"`>UbY`@]	<u>1b[1b["`]4 i bgk "YXi "Ui</u>	H65	Fa)%(ž@` )žGUaiY`g 6i]`X]b[ fl&)Ł	

## GWXcc`7cbHJWh′±bZcfa Uh]cb

 $\label{eq:continuity} \textit{Gh XYbhGYfj ]WYg `WJb `VY `WcbhJWYX `j \ ]U `i \ bgk \ "hc \# \ YV \ Zcfa \ g" }$ 

# 7ci fgY 8YHJ] g

#### $I b h c Z 7 f Y X h^*$

### Gi a a UfmcZh\Y 7ci fgY

#### 7ci fgY 5]a g

HY'U]a g'cZh']g'Wci fgY'UfY'hc.

- ]bhfcXi WY`ghi XYbhg`hc`h\Y`Z bXUa YbhU`g`cZY`YWff]WU``Yb[]bYYf]b[`'Ug`]hfY`UhYg`hc'i bXYfghUbX]b[ V]cY`YWff]Wd\Ybca YbU`UbX`bYi fU``gh]a i `Uh]cb
- i bXYfgHJbX'h\Y'd\mg]WJ`df]bW]d`Yg'k\]W\'[cjYfb'h\Y'a YUgi fYa YbhcZU'V]c`c[]WJ`'j Uf]UV`Y'cf gmghYa 'Vm'U'hfUbgXi WYf'k\]W\ Wbj Yfhg'h\Y'j Uf]UV`Y']bhc'Ub'Y`YWf]WJ`'g][bU`
- i bXYfgHJbX'j Uf]ci gʻa YUgi fYa YbhiXYj ]WYgʻUbX'UddfcUWXYgʻ]bWi X]b[ 'h\Y'i bXYf`m]b[ 'V]c`c[ ]WJ` dfcWYgg'h\Uh[ YbYfUhYg'h\Y'ei Ubh]mmc'VY'a YUgi fYX'cf'Wcblfc``YX

# 7ci fgY @YUfb]b[ 'Ci hWca Yg

- %" → YbhJZmh\Y`gWcdY`cZV]ca YX]WU``]bghfi a YbhUh]cb`UbX`]hg`Udd`]WUh]cbg
- &" 9I d`U]b Z bXUa YbHJ`[YbYfU`IfUbgXi Wqcb UbXV]cgYbg]b[ 'df]bW]d`Yg
- '" 8 ]gW ggžXYj Y`cd`UbX`Udd`m'Y`YWf]WU``Yb[ ]bYYf]b[ `WcbW'dhg`UbX`df]bW]d`Yg`hc`U`fUb[ Y`cZdfcV`Ya g UbX`a YX]WU``Udd`]WUh]cbg
- ("7f]h]WU``mfYj]Yk 'h\Y``]hYfUh fY`]b'h\Y`UfYU'UbX'i gY'h\]g'\_bck `YX[Y'hc'UbU`mgY'g]a d`Y'V]cgYbg]b[UbX'hfUbqXi Wh]cb'dfcV`Ya q
- ) " Gi a a Uf]gY 'UbX 'Wa a i b]WUHY 'Z]bX]b[ g 'Zfca ``]HYfUH fY 'fYgYUfWX 'i g]b[ 'cfU` 'UbX 'k f]HHYb 'a Yh\cXg

## HYUW ]b[ GlfUhY[]Yg

 $6 \cdot \text{CA} - \text{*($'i gYg'A ccX'Y'Zcf'fYa chY'hYUW\]b['UbX'`YUfb]b[''+ik']``VY'i gYX'Zcf'Z]'Y'g\Uf]b['z'j']fhi U` WUggfcca gz'Ubbci bW'a Ybhg'UbX'ch\Yf'Wca a i b]WUh]cbg''Mci 'UfY'YI dYWhYX'hc'W\YW_'h\Y'd`UhZcfa fY[i `Ufm''+b'h\Y'Z]fgh']bghUbW'z'mci 'UfY'YbWci fU[YX'hc'Ug_'ei Ygh]cbg'UZYf'`YWhi fYg'''Ch\Yfk']gY'X]gW gg]cbg UbX'ei Ygh]cbg'hU_Y'd`UW']b'h\Y'8]gW gg]cb': cfi a ']b'A ccX'Y''Mci f'XYa cbghfUhcfg'UbX'UWUXYa ]WghUZk']`` UWh] Y`ma cb]hcf'h\YgY'dcghg''=ZfYei ]fYXz'Ya U]`g'a i ghVY'a UXY'Zfca 'mci f'ghi XYbhYa U]`'UXXfYgg'k']h\ 6 \lefta - \times ($']b'h\Y'gi VYWh']bY''$ 

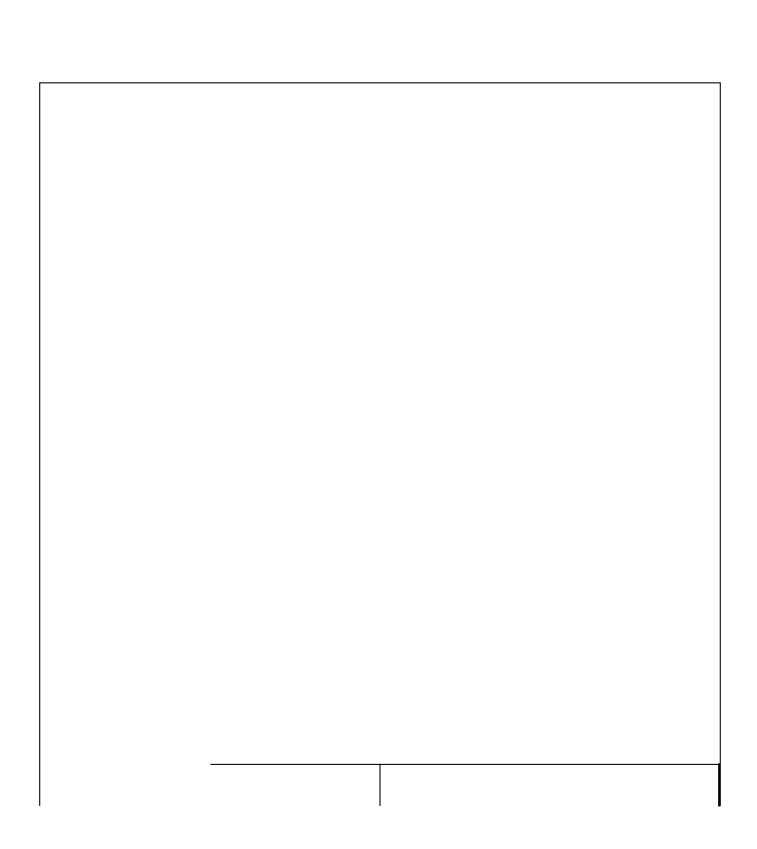
H\]g`Wci fgY`Wcbg]ghg`cZ]bhY[fUhYX``YWhi fYz`hi hcf]U``UbX`dfUWh]WU``k cf\_"': cf`h\Y`Z]fgh`\U`ZcZh\Y`hYfa `h\YfY k]```VY`U'' `\ci f`dYf]cX`Wca df]g]b[`U``YWhi fY`UbX`ga U```[fci d`Yl YfW]gYg#hi hcf]U`gz`[fci d`X]gWi gg]cbg`UbX ch\Yf`a Yh\cXg`hc`ZJW]`]hUhY`ghi XYbh`YUfb]b["'=b`h\Y``UhYf`\U`ZcZh\Y`hYfa `U`gYhcZ`UVcfUhcfmYl dYf]a Ybhg

k]```VY`WcbXi WhYX`rc`fY]bZcfW\'dfUWhW\`UgdYWg`cZV]ca YX]\W\``]bglfi a YbhUhcb`UbX`V]cY`Y\Wf]\W\d\Ybca YbU\'`DfcV`Ya 'gc`j ]b[']g`Ub`YggYbhJU``Wca dcbYbhcZh\]g`gi V`Y\Wf'5``A ccX`Y`\\circ fgYk UfY`a cXi `Y\\Ug`VYYb`YghU\`]g\YX`Zcf`h\]g`gi V`Y\\formalig`gi V\Y\\formalig`gi V\Y\\formalig` V\\gammalig` V\\gammalig` V\Y\\formalig` V\\gammalig` V\\gammalig`

H\]g`Wci fgY`fYei ]fYg`mci 'hc'i bXYfghUbX`h\Y``YWi fY`a UhYf]U``UbX`h\Yb`Udd`mih\Y`\_bck `YX[Y`hc`VUg]W

# 5ggYgga Ybh

5ggYgga Ybh'HJg_	K Y][ \h	8iY'8UHY	7 ci fgY @YUfb]b[ Ci hWca Yg 5ggYggYX
%":Hi hcf]U`gž' < UbX`]b E i Ygh]cbg	%) ၊	GYd!&\$žGYd!&+žCW11%%ž CW11%	%ž &ž '
&"`@UVcfUhcfm5hhYbXUbVW	%\$I		



## FYgci fW/g

### DfYgWf]VYX F Ygci fWYg

• A ccX`Y

#### FYWca a YbXYX FYgci fW/g

- 6]ca YX]WU``HfUbgXi WYfg`UbX`±bglfi a Yblgž`Vm'H"`Hc[Uk Už`H"`HUa i fU`UbX`D"5"`C VYf[`ff7 F 7 DfYgg\t''
- A YX]WU``=bglfi a YbhUhcb'--'5dd`]WUhcb'UbX'8Yg][ bžYX]hYX'Vm'>"; "'K YVghYf'fkci [\hcb'A]Z]bŁ"'5b YI WYfdhZfca 'U'WXUdhYf']b'U'Vcc\_'h]hYX'"D\mg]c`c[]WU``A YUgi fYa Ybh''k]``'U'gc'VY'gi dd`]YX"

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

5 bcbma ci gʻghi XYbhʻZYXVUW\_ʻcbʻrh\YʻWci fgYʻUbXʻrh\Yʻ`YWn fYfgʻ]bʻrh\YʻWci fgYʻ]gʻ[Uh\YfYXʻdYf]cX]WU``m i g]b[ʻrh\Yʻi b]j Yfg]mmgʻ\_ k7j bWq[W UWDfcWrgg"'Mci fʻZYYXVUW\_ʻ]gʻa i W\`UddfYW]UhYX`UbXʻrh\_Ybʻj Yfm gYf]ci g`mʻʻ7 cbh]bi U``]a dfcj Ya YbhgʻUfYʻa UXYʻrbʻrh\YʻWci fgYʻVUgYX`]bʻdUfhicbʻgi W\`ZYYXVUW\_ʻUbXʻrh\]g \Yʻdgʻi gʻrbʻ]a dfcj Yʻrh\YʻWci fgYʻZcfʻZ hi fYʻghi XYbhg"

# Gi Va ]gg]cb cZ5ggYgga YbhHUg\_g

 $@UVcfUlcfmfYdcflg`UbX`a\ U\cf`Ugg][\ ba\ Yblg`k\ ]```fYei\ ]fY`U`Bcb`D`U[\ ]Uf]ga\ `8YWUfUl]cb`7\ cj\ Yf`G\YYL''$ 

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

#### D@5; -5F - €A

6Yk UfY"5b"Ugg][ ba Ybhih Uh']bWi XYg'd`U[ ]Uf]gYX'a UhYf]U`'k ]```fYWY]j Y'U'\$ı :: U]`ž'UbX'ghi XYbhg'k \c d`U[ ]Uf]gY'a UmZJ]`'h\Y'Wti fgY"'Ghi XYbhg'k \c d`U[ ]Uf]gY'k ]``\Uj Y'h\Y]f'bUa Yg'YbhYfYX'cb'U'd`U[ ]Uf]ga fY[ ]ghYf'UbX'k ]``VY'`]UV'Y'hc'X]gW]d`]bUfmUW]cbž']bWi X]b[ 'YI Wi g]cb'Zfca 'Ybfc`a Ybh''

 $\pm i]g'Yl \ dYWMYX'h\ Uh'U```ghi \ XYbhg'a i gh'Uh'U```h]a \ Yg'gi \ Va \ ]hh\ Y]f'ck b'k \ cf_'Zcf'UggYgga \ Ybh''Gi \ Va \ ]hh\ ci h'WYUf'mUW_bck `YX[ ]b[ 'h\ Y'gci fW''cZVcffck YX'a UhYf]U``cf']XYUg']g \ d`U[ ]Uf]ga "$ 

5```UggYgga Ybhg`k\]W\`mci `\UbX`]b`a i gh\Uj Y`U`<u>B cb`D`U[]Uf]ga '8YWUfUhjcb`7 cj Yf`G\YYh</u>''`H\]g`]g`Zcf Vch\`]bX]j ]Xi U``UbX`[ fci d`k cf\_"'5htUW\`]hhc`mci f`Ugg][ ba Ybh\VYZcfY`gi Va ]hhb[ ']hhc`h\Y`7 ci fgY 7 ccfX]bUhcf`cf`Uhh\Y`GW\cc``C Z]W\''

D`U[]Uf]ga `]g`h\Y`i gY`cZUbch\Yf`dYfgcb'g`k cf\_`cf`]XYUg`Ug`]Zh\Ymk YfY`mci f`ck b"`K \Yb`]h`]g`bYWfggUfmcf XYg]fUV`Y`hc`i gY`ch\Yf`dYcd`Y'g`a UhYf]U``mci `g\ci `X`UXYei UhY`mUW\_bck `YX[Y`k \cgY`k cfXg`cf`]XYUg`h\Ym UfY`UbX`k \YfY`mci `Zci bX`h\Ya `f[]j ]b[ `h\Y`Wca d`YhY`fYZYfYbW'XYhU]`gž`]bWi X]b[ `dU[Y`bi a VYffg\\"\H\Y @YUfb]b[ `7 YbhfY`dfcj ]XYg`Z fh\Yf`]bZcfa Uh]cb`cb`k \UhWcbgh]hi hYg`D`U[]Uf]ga `Uh \hdg.#gh XYbh'i bgk "YXi "Ui #d`U[]Uf]ga

## 5 WUXYa ]W = DZcfa Uhjcb

#### 7CI FG9 9J5@ 5H€B 5B8 89J9@CDA 9BH

Gh XYbhZYXVUW\_`\Ug`\Y`dYX'hc`g\UdY`UbX`XYjY`cd`h\]g`Wci fgYž]bWi X]b[ 'ZYYXVUW\_`cVhJ]bYX`Zfca 'cb! `]bY`Yj U`i Uh]cbg`Ug`dUfhcZI BGK 'g`Ug`dUfhcZI BGK 'g`a m9I dYf]YbWY`dfcWYgg"'Mci 'UfY`\][ \`m YbWci fU[ YX`hc`Wca d`YhY`gi W.`Ub`cb!`]bY`Yj U`i Uh]cb`hck UfX`h\Y`YbX`cZHYfa "': YYXVUW\_`UbX`gi [ [ Ygh]cbg dfcj ]XYX`k ]```VY`]a dcfhUbh`]b`]a dfcj ]b[ 'h\Y`Wci fgY`Zcf`Z h fY`gh XYbhg"

#### 85H9G'HC'BCH9

 $\label{eq:final_substitution} FYZYf^hc^A ml BGK^Zcf^& dcfhUbh8UhYg^*UjU]^UV^Y^Uh $$ \underline{hdg.\#a n''i bgk "YXi "Ui #ghi XYbh#Ygci fVWg#? Ym8UhYg"\ha` }$ 

.

#### 57589A = 758J = 79

: cf ]bZcfa Uhcb UVci h

- "BchYg'cb'UggYgga Ybhg'UbX'd'U[]Uf]ga ž
- · · · · GdYWJU` · 7 cbg]XYfUh]cbgž
- "GWXcc"Gh XYbh9h\]Wa'CZZWYfž'UbX
- .... 69GG

.

#### Gi dd'Ya YbhUfm'91 Ua ]bUh]cbg.

Gi dd`Ya YblUfm91 Ua ]bUh]cbg`Zcf`HYfa '' '&\$&%k ]```VY`\Y`X`cb`A cbXUm%\$h\`>Ubi Ufm—': f]XUm'%( h\`&\$&%k ]```VY`\Y`.