

!" #&/  
4;O <548G=>3> 70AB>AC20==O ;V:0@AL:>3> 70A>1C

#□ □"  
(NUCLEINAT)

!::04:

4VNG0 @5G>28=0: ribonucleic acid;

1 :0?AC;0 B8 @81>=C::5W=>2>W C ?5@5@0EC20==V =0 ACEC @5G>28=C 250 <3;  
4>?>28=8: ;0:B>78 <=>3V4@0B, <03=VN AB50@0B.

V:0@AL:0 D>@<0. 0?AC;8.

A=>2=V DV78:>-EVABV: B25@4V 65;0B8=>2V :0?AC;8 7 :@8H5G:>N V :>@?CA< 1V;>3> :>;L>@C.  
@>H>: 2V4 <0965 1V;>3> 4> A2VB;>-6>2B>3> 7 AV@C20B8< 2V4BV=:< :>;L>@C.

\$0@<0:>B5@0?52B8G=0 3@C?0.

=B8=5>?;0AB8G=V B0 V<>4C;NNGV 70A>18.

>4 "% L03 □ X.

\$0@<0:>;>3VG=V 2;0AB82>ABV.

\$0@<0:>48=0

<>4C;NNG89 70AV1, O:89 AB8?>57 C :VAB:>2>>?5@0FVN "- V -;VF8BV2 B0 D03>F8B0@=C  
0:B82=VABL<0:@>D03V2, ?>A8;NNG8 0:B82=VABL D0:B>@V2 =5A?5F8DVG=>W @578AB5=B=>ABV.  
0T ?@>B870?0;L=C 0:B82=VABL V ?@83=VGCT ?V428I5=C 03@530FVN B@<1>F8BV2.  
>A=>2V D0@<0:>B5@0?52B8G=8E 5D5:BV2 ?@5?0@0BC ;560BL B0:V <5E0=V7<8: AB8F5AV2  
;;VB8=>3> <5B01>;V7A8;5==O 1V>A8=B57C 5=4>35==8E =C::5W=>28E :8A;>B, A?5F8DVG=8E  
?@>B5W=V2 B0 D5@<5=BV2; ?>A8;5==O B8G=>W 0:B82=>ABV ;;VB8= :VAB:>2>3><>7:C,  
?@8A:>@5==O ?@>F5AV2 @535=5@0FVW; ?V428I5==O 5=5@3>70157?5G5==O ;;VB8=8 H;OE< AB8  
NO-A8=B5B07=>W 0:B82=>ABV, V=3V1C20==O >:8A=8E ?@>F5AV2 C ;;VB8==8E<5<1@0=0E,  
AB01V;V70FVO <5<1@0= ;;VB8= B0 >?B8:8A=>-2V4=>2=8E ?@>F5AV2 C B:0=8=0E; ?V428I5==O  
?@>4C:C20==O V=B5@D5@>=C B0 AB8B82V@CA=>3> 70E8ABC; 0:B820FVO 3V?>DV70@=>-  
=04=8@:>2>70;>7=>W A8AB5<8 7V 71V;LH5==O< @V2=O 5=4>35==8E 3;N:>:>@B8:>W4V2.  
\$0@<0:>:V=5B8:0. 5 282G0;0AO.

;V=VG=V E0@0:B5@8AB8:8.

>:070==O.

45DVF8B=V AB0=8, 0;5@3VO, ?A>@V07, ;59:>?5=VO, 03@0=C;>F8B>7, ?>@CH5==O D>AD>@=>3> >1  
AD0BC@VO, @0EVB).

# :>7C, ?=52<>=VW, E@>=VG=>3> 1@>=EVBC, @52<0B8G=8E 70E2>@N20=L, E@>=VG=8E  
2V@CA=8E 35?0B8BV2, C@>35=VB0;L=>3> 35@?5AC, E;07C.

# :>O:VA=8E ?CE;8= (70 C<>2 ?@>2545==O F8B>AB0B8G=>W B5@0?VW), O:V AC?@>2>46CNBLAO  
@>728B:<< V45DVF8BC B0 7=865==O< =5A?5F8DVG=>W @578AB5=B=>ABV >@30=V7  
@8 @>7C<>2V9, DV78G=V9 ?5@52B>2;5==O V3> ?>B5=FV0;C. ;O ?V4B@83> AB0=C B0 70157?5G5==O  
=091V;LH H8@>:>W B@>DVG=>W ?V4B@8W A8AB5<8 ;N459 ;VB=L>3> 2V:C.

@>B8?>:070==O.

=482V4C0;L=0 =5?5@5=>A8=5=BV2 ?@5?0@0BC, 35<>1;0AB>78 (;59:>78, 7;>O:VA=V ;V<8). >403@0.

70T<>4VO 7 V=H8<8 ;V:0@AL:8<8 70A>10<8 B0 V=HV 2848 270T<>4V9.

@8 ;V:C20==V 0=B81V>B8:0<8 B0 2VB0A8;NT B5@0?52B8G=C 5D5:B82=VABL ;V:C20==O. @8  
>4=>G0A=>AC20==V 7 0=B803@530=B0<8 B0 0=B8:>03C;O=B0<8 C 7207:C 7 ?V428I5==O< @878:C  
:@>2>B5G =5>1EV4=> :>=B@>;N20B8 ?>:07=8:8 73>@B0==O :@>2V. @8 =5>1EV4=>ABV  
?@87=0G5==O E2>@8< 7 28A>:8< @V2=5< A5G>2>W :8A;>B8 2 0<=57V ?@5?0@0B @5:><5=4CTBLAO  
70AB>A>2C20B8 @07>< 7 0;>?C@8=>;>

A>1;82>ABV 70AB>AC20==O.

V:C20==O ?@>2>48B8 ?V4 :=B@>;5< V3> AB0BCAC B0 @V2=O A5G>2>W :8A;>B8. /:I> C ?0FVT=B0  
2AB0=>2;5=0 =5?5@5=>A8:>=AC;LBC20B8AO 7 ;V:0@5<, ?5@H =V6 ?@89<0B8 F59 ;V:0@AL:89 70AV1.  
@5?0@0B 7C, B>

**0AB>AC20==O C ?5@V>4 203VB=>ABV 01> 3>4C20==O 3@C44N.** V4ACB=V9 4>AB0B=V9 ;;V=VG=89  
4>A2V4 70AB>AC20==O ?@5?0@0BC C ?5@V>4 203VB=>ABV 01> 3>4C20==O 3@C44N, B>A>2C20B8  
F8< :0B53>@VO< ?0FVT=BV2.

**40B=VABL 2?;820B8 =0 H284:VABL @50:FVW ?@8 :5@C20==V 02B>B@0=A?>@B< 01> @>1>BV 7**  
**V=H8<8 <5E0=V7<0<8.** C.;5W=0B =5 2?;820T =0 H284:VABL @50:FVW ?@8 :5@C20==V  
02B>B@0=A?>@B< 01> @>1>BV 7 V=H8<8 <5E0=V7<0<8.

**!>AV1 70AB>AC20==O B0 4>78.**

0AB>A>2C20B8 ?5@>@0;L=>.

>@>A;8< 70AB>A>2C20B8 ?> 0,25 3 4 @078 =0 4>1C ?VA;O W48.

C@A ;V:C20==O 10-14 4=V2.

**VB8.** 0 40=89 G0A =5<0T 4>A2V4C 70AB>AC20==O ?@5?0@0BC 4VBO<, B>2V9 :0B53>@VW  
?0FVT=BV2.

**5@54>7C20==O.**

18<8 ?5@54>7C20==O C ;N48=8 =5 28O2;5=V.

**>1VG=V @50:FVW.**

I>:C B@02=>3> B@0:BC: ?@8 ?5@>@0;L=>AC20==V ?@5?0@0BC =0BI5 <>6;8289 1V;L 2  
5?V30AB@VW, 48A?5?A8G=V ?@>O28.

I>:C >128=: ?V428I5==O @V2=O A5G>2>W :8A;>B8 C A8@>20BFV :@>2V.

I>:C VW A8AB5<8: @50:FVW 3V?5@GCB;82>ABV.

**"5@ABV. 3 @>:8.**

**#<>28 715@V30==O.**

15@V30B8 2 >@83V=0;L=V9 C?0:>2FV ?@8 B5 28I5 25 °!.

15@V30B8 2 =54>ABC?=>.

**#?0:>2:0.**

0?AC;8 ?> 250 <3, 80 C :=B59=5@V, 1 :=B59=5@ 2 ?0GFV 01> 10 C 1;VAB5@V, 3l;VAB5@8 2 ?0GFV.

**0B53>@VO 2V4?CA:C. 57 @5F5?B0.**

**8@>1=8:.** " «8W2<54?@5?0@0B».

**VAF57=0E>465==O 28@>1=8:0.**

#: @0W=0, 01032, 3>, 139.

**0O2=8:.** >GV@=T ?V4?@8T «V>!5;» :>@?>@0FVW «0V5A5; 51>@5B>@V7 >@?>@59H=>».

**VAF57=0E>465==O 70O2=8:0 B0 9>3> 04@5A0 20465==O 4VO;L=>ABV.**

#: @0W=0, 01021, . 20=>20, 10.

!" #&/  
> <548F8=A:>

#□ □"  
(NUCLEINAT)

!>AB02:

459AB2CNI55 25I5AB2>: ribonucleic acid;

1 :0?AC;0 A>45@68B :8A;>BK @81>=C.;58=>2>9 2 ?5@5AG5B5 =0 ACE>5 25I5AB2> 250 <3;  
2A?><>30B5;L=K5 25I5AB20: ;0:B>7K <=>384@0B, <03=8O AB50@0B.

5:0@AB25==0O D>@<0. 0?AC;K.

A=>2=K5 D878:>-E8<8G5A:85 A2>9AB20: B25@4K5 65;0B8=>2K5 :0?AC;K A :@KH5G:>9 8 :>@?CA<

15;>3> F25B0. !>45@60=85 :0?AC;K ?>@>H>: >B ?>GB8 15;>3> 4> A25B;>-65;B>3> A A5@>20BK<

>BB5=:>< F25B0.

\$0@<0:>B5@0?52B8G5A:0O 3@C??0.

=B8=5>?;0AB8G5A:85 8 8<<>4C;8@CNI85 A@54AB20.

>4 "L03 □ X.

\$0@<0:>;>38G5A:85 A2>9AB20.

\$0@<0:>48=0<8:0.

<<>4C;8@CNI55 A@54AB2>, :>B>@>5 AB8?>M7 2 :>AB=>< <>735, 2>7>1=>2;OO 48DD5@5=F80F8N,

:0G5AB25==K9 8 :>;8G5AB25==K9 A>AB02 ;;5B>: :>AB=>3> <>730 8 ?5@8D5@8G5A:>9 :@>28. >@

<0;87C5B ;;5B>G=K9 8<2KH0O <83@0F8N 8 :>>?5@0F8N "- 8 -;8F8B>2 8 D03>F8B0@=CN 0:B82=>ABL

<0:@>D03>2, CA8;820O 0:B82=>ABL D0:B>@>2 =5A?5F8D8G5A:>9 @578AB5=B=>AB8. <55B

?@>B82>2>A?0;8B5;L=CN 0:B82=>ABL 8 ?>402;05B ?>2KH5==CN 03@530F8N B@<<1>F8B>2.

>A=>25 D0@<0:>B5@0?52B8G=8E MDD5:B>2 ?@5?0@0B0 ;560B B0:85 <5E0=8720=85 ?@>F5AA>2

::5B>G=>3> <5B01>;87<0, CA8;5=85 18>A8=B570 M=4>35==KE =C.;58=>2KE :8A;>B, A?5F8D8G5A:8E

?@>B58=>2 8 D5@<5=B>2; CA8;5=85 <8B>B8G5A:>9 0:B82=>AB8 ;;5B>: :>AB=>3> <>730, CA:>@5=85

?@>F5AA>2 @535=5@0F88; ?>2KH5=85 M=5@3>>15A?5G5=8O ;;5B:8 ?CB5< AB820=8O A8=B570

<0:@>M@38G5A:8E A>548=5=89, B0:8E :0: "\$; =>@<0;870F8O NO-A8=B5B07=>9 0:B82=>AB8,

8=3818@>20=85 >:8A;8B5;L=KE ?@>F5AA>2 2 ;;5B>G=KE <5<1@0=0E, AB018;870F8O <5<1@0= ;;5B>:

8 >?B8<870F8O >:8A;8B5;L=>-2>AAB0=>28B5;L=KE ?@>F5AA>2 2 B:0=OE; ?>2KH5=85

?@>4CF8@>20=8O 8=B5@D5@>=0 8 AB820=85 ?@>B82>28@CA=>9 70I8BK; 0:B820F8O

38?>D870@=>=-04?>G5G=8:>2>9 A8AB5

\$0@<0:>:8=5B8:0. 5 87CG0;0AL.

;8=8G5A:85 E0@0:B5@8AB8:8.

>:070=8O.

<45D8F8B=K5 A>AB>O=8O, 0;;5@38O, ?A>@807, ;59:>?5=8O, 03@0=C;>F8B>7, =0@CH5=85

D>AD>@=>3> >1<5=0 (D>AD0BC@8O, @0E8B).

:>9 B5@0?88 BC15@:C;570, ?=52<>=88, E@>=8G5A:>3> 1@>=E8B0, @52<0B8G5A:8E 701>;520=89,

E@>=8G5A:8E 28@CA=KE 35?0B8B>2, C@>35=8B0;L=>3> 35@?5A0, E;0<848>70.

:>< ;5G5=88 7;>:0G5AB25==KE >?CE>;59 (?@8 CA;>288 ?@>2545=8O F8B>AB0B8G5A:>9 B5@0?88),  
:>B>@K5 A>?@>2>640NBAO @0728B85< 8<45D8F8B0 8 A=865=85< =5A?5F8D8G5A:>9  
@578AB5=B=>AB8 >@30=87<0.

@8 C<, D878G5A:>< ?5@5CB><;5=88, AB@5AA0E 4;O 2>7>1=>2;5=8O 8<3> ?>B5=F80;0. ;O ?>445@6:8  
D878G5A:>3> A>AB>O=8O 8 >15A?5G5=8O =081>;55 H8@>:>9 B@>D8G5A:>9 ?>445@6:8 8<9 A8AB5  
68;>3> 2>7@0AB0.

@>B82?>:>:070=8O.

=48284C0;L=0O =5?5@5=>A8<>ABL :>=5=B>2 ?@5?0@0B0, 35<>1;0AB>7K (;59:>7K, 7;>:0G5AB25==K5  
;8 >403@0.

708<>459AB285 A 4@C38<8 ;5:0@AB25==K<8 A@54AB20<8 8 4@C385 284K 2708<>459AB289.

@8 ;5G5=88 0=B818>B8:0<8 8 28B0<8=0<8 ?@8<5=5=85 ?@5?0@0B0 2 :>9 B5@0?88 7=0G8B5;L=>  
CA8;8205B B5@0?52B8G5A:CN MDD5:B82=>ABL ;5G5=8O. @8 >4=>2@5<5==>< ?@8<5=5=88 A  
0=B803@530=B0<8 8 0=B8:>03C;O=B0<8 2 A2O78 A ?>2KH5=85< @8A:0 :@>2>B5G5=89 =5>1E>48<>  
:>=B@>;8@>20BL ?>:070B5;8 A25@BK205<>AB8 :@>28. @8 =5>1E>48<>AB8 =07=0G5=8O 1>;L=K< A  
2KA>:8< C@>2=5< <>G52>9 :8A;>BK 2 0<=5788 ?@5?0@0B @5:><5=4C5BAO ?@8<5=OBL 2<5AB5 A  
0;>?C@8=>;>

A>15==>AB8 ?@8<5=5=8O.

5G5=85 ?@>2>48BL ?>4 :>=B@>;5< 8<<C==>3> AB0BCA0 8 C@>2=O <>G52>9 :8A;>BK. A;8 C  
?0F85=B0 CAB0=>2;5=0 =5?5@5=>A8<>ABL =5:>B>@KE A0E0@>2, ?@>:>=AC;LB8@>20BLAO A  
2@0G><, ?@5645 G5< ?@8=8<0BL MB>B ?@5?0@0B. @5?0@0B A>45@68B ;0:B>7C, ?>MB>

@8<5=5=85 2 ?5@8>4 15@5<5==>AB8 8;8 :>@<;5=8O 3@C4LN. BACBAB2C5B 4>AB0B>G=K9  
::8=8G5A:89 >?KB ?@8<5=5=8O ?@5?0@0B0 2 ?5@8>4 15@5<5==>AB8 8;8 :>@<;5=8O 3@C4LN,  
?>MB>

!>A>1=>ABL 2;8OBL =0 A:>@>ABL @50:F88 ?@8 C?@02;5=88 02B>B@0=A?>@B< 8;8 @01>B5 A  
4@C38<8 <5E0=87<0<8. C.;58=0B =5 2;8O5B =0 A:>@>ABL @50:F88 ?@8 C?@02;5=88  
02B>B@0=A?>@B< 8;8 @01>B5 A 4@C38<8 <5E0=87<0<8.

!>A>1 ?@8<5=5=8O 8 4>7K.

@8<5=OBL ?5@>@0;L=>.

7@>A;K< ?@8<5=OBL ?> 0,25 3 4 @070 2 ACB:8 ?>A;5 54K.

C@A ;5G5=8O 10-14 4=59.

5B8. =0AB>OI55 2@5?KB0 ?@8<5=5=8O ?@5?0@0B0 C 45B59, ?>MB>9 2>7@0AB=>9 :0B53>@88  
?0F85=B>2.

5@54>78@>2:0.

1878@>2:8 C G5;>25:0 =5 2KO2;5=K.

>1>G=K5 @50:F88.

!> AB>@>=K ?8I520@8B5;L=>3> B@0:B0: ?@8 ?5@>@0;L=>< ?@8<5=5=88 ?@5?0@0B0 =0B>I0: 2>7  
<>6=0 1>;L 2 M?830AB@88, 48A?5?A8G5A:85 ?@>O2;5=8O.

!> AB>@>=K >1<5=0 25I5AB2: ?>2KH5=85 C@>2=O <>G52>9 :8A;>BK 2 AK2>@>B:5 :@>28.

!> AB>@>=K 8<9 A8AB5 @50:F88 38?5@GC2AB28B5;L=>AB8.

!@>: 3>4=>AB8. 3 3>40.

#A;>28O E@0=5=8O.

%@0=8BL 2 @>838=0;L=>9 C?0:>2:5, ?@8 B5 25 °!.

%@0=8BL 2 =54>ABC?=>< 4;O 45B59 <5AB5.

**#?0:>2:0.**

0?AC;K ?> 250 <3, 80 2 :=B59=5@5, 1 :=B59=5@ 2 ?0G:5 8;8 10 2 1;8AB5@5, 3 1;8AB5@0 2 ?0G:5.

**0B53>@8O >B?CA:0. 57 @5F5?B0.**

**@>872>48B5;L. «852<54?@5?0@0B».**

**5AB>=0E>645=85 ?@>872>48B5;O 8 53> 04@5A <5AB0 >ACI5AB2;5=8O 45OB5;L=>AB8.**

#:@08=0, 01032, 3. 852, C;. !0:A030=A:>3>, 139.

**0O28B5;L. >G5@=55 ?@54?@8OB85 «8>!5;» :>@?>@0F88 «085A5; 51>@5B>@87 >@?>@59H=».**

**5AB>=0E>645=85 70O28B5;O.**

#:@08=0, 01021 3. 852, C;. . 20=>20, 10.