

Chunk 1

ZK[KF ZIN FZ\OIS K

_ol/lk€on tzto~voztt{z€ q{~qok~ {qmkzmo~

~omu~~ozmo> F€m{|tzt ~ovtow wtts kq{mu€ {z

€urro€tt{z€ q{~tsonovow{|yozt kzn

ovkwuktt{z {qqutu~o tzto~voztt{z€

[{wotrktlkt o O]

4*.[soowk \~t|ksoo5.Nowoz T{qqk6.Gok~t Kwlo~ro~ O]

7.

[k~k Tkmwozzkz5

4Jo|k~yoz {qWms{w{rt mkw[mtozmo kznNokws.]zt o~t {q[~k smwn
o.Mwkr{.]zt on Rtzn{y.

5Fmknoytm]~{w{r]zt. [ms{{w {qTontmtzo. Tontmkw [mtozmo kznU~t{z.
]zt o~t {qFlo~nooz.

Chunk 2

Flo~nooz.]zt¹on Rtzrn{y .6UN[M~ky|tkz. Flo~nooz Z{¹kw Ozqt~yk~¹. L{~o¹¹o~
 stww[t¹o. Flo~nooz.]zt¹on
 Rtzrn{y .7UN[M~ky|tkz. Flo~nooz Z{¹kw Ozqt~yk~ ¹.G~ok¹¹]zt¹. Flo~nooz.]zt¹on
 Rtzrn{y
 *[{w¹otr k1¹tlkt¹oE¹¹ ~k¹s1km1¹v
 FlEt~kmt
 W¹~|{¹o
 \so {luom¹t¹o {q¹st¹¹m{|tzt ~o¹to¹ t¹¹{|~{¹tno kz{¹o~¹to¹ {q¹sok¹ktwklwo
 o¹tnozmo {z
¹sooqqom¹t¹ozo¹¹ {q¹ol/lk¹on tz¹o~¹oz¹t{z¹ q{~qok~ {qmkzmo~ ~om¹~~ozmo
 *LIZ+ kznknt¹/
 m¹¹¹t{z {qn~k¹lkmv¹ kzn|{¹¹tlwo ty|~{¹oyoz¹¹ q{~¹ol/lk¹on tz¹o~¹oz¹t{z¹
 tnoz¹tqton tz

Chunk 3

so~otoon onto1 \soo o| qwqtw sokty{qst~oto. stms
 t{{qqo~ rro{t{z
 q{~now{|tzt q~o ol/lkon tz~ozt{z lk on {zso~otoon onto1
 To{s{n
 Lt nkklk *WITon. TKJSOUK. KTGF[K. [IVW][kzn_ol {q[mtozmo+ o~o
 ok~mson1 V~trtzkw |oo~/~otoon k~tmwo. ~t{oz tzKzrwt{s. {zol/lkon
 tz~ozt{z
 q{~LIZ o~o tzmwnon q{~~oto1 \so nk k q~{y sotzmnwnon onto k
 zso{ton
 soyk{tmkww1
 Zo{w{

Chunk 4

1soyk1tmkww1
 Zo11w11
 _otzmw1non 67|k|o~ 1 ~o|{~1tzt {z5<tz1o~1oz1t{z11 T{11 {q1so1111nto1
 tz1so|k|o~1 1o~o
 }1kz1t1k1t1o kznýt1on }1kz1t1k1t1o 1111nto1 1t1s k}1kwt1k1t1o owoyoz1.
 olr1kztz1o~1to1 |{11/
 tz1o~1oz1t{z1 Oz1o~1oz1t{z1 1o~o y{11 m{yy{zw1 1~tkwwon 1t1s 1{yoz
 l~ok11 mkzmo~ |k1toz111
 \{| 1s~oo m{1z1~to1 1so~o 1111nto1 1o~o m{zn1m1on 1o~o][F. F1111~kwtk
 kzn1soUo1so~/
 wkzn1 \so y{11 m{yy{z 1so{~o1tmkw q~kyo1{~v q{~tz1o~1oz1t{z1 t1m{rzt1t1o
 losk1t{1~kw

so~k| *IG\+. q{ww{on l ytnq wzo/lon kznyt on IG\ ytnq wzo.

kmmo|kzmo

kznm{yyt yo zso~k| *FI\+. ~owk k t{z k||~{kmso 1LIZ k so|~tyk~

q{m2yok/

~o tz4=[nto. tz=nto LIZ k k om{znk~2~owk on{m{yo2yo

k~o1 V o~kww.

soo tnozmo {qoq qtmkm {q ol/lon tz o~ oz t{z {zLIZ t yt on1

PLOS ONE

WSV[VUK s>22n{t1{~ r243146; 42u{~zkw1|{ zo13645; := U{oylo~ <.5357

425:k4444444444

k4444444444

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OPEN ACCESS

Chunk 6

k4444444444

k4444444444

k4444444444

OPEN ACCESS

Itk{t{z> ctlkt o [. \~t|ksoo [.T{qqk N.Kwlo~ro~
G.Tkmwozz kz[*5357+ _ol/lko ntzo~ozt{z
q{~qok~{qmkzmo~ ~om~~~ozm o>Fm{|tzt ~oto
t{skq{m {zrrro{t{z q{~sonoow{|y oz
kznokwk{t{z {qq~~~o tzo~ozt{z 1WS{[VUK
4=*44+> o3645;:=1 s|>22n{t1{~r243 146;42u{~zkw1
|{zo13645;:=
Knt{~> Lkyk Zoqkk Fsyon.]zt o~t{ {q[sk~uks
I{wworo {qNokws [mtozmo.]UO\KJ FZFG
KTOZF\K[
Zomoton> Qzo 53.5357
Fmmo|on> Vm{lo~ 46.5357

Chunk 7

Zomoton> Qzo 53.5357

Fmmo|on> Vm{lo~ 46.5357

Wlwtson> U{oylo~ <.5357

I{|~trs> ©5357 ctlkt o okw1\sttkz{|oz

kmmo k~tmwo nt~tlon zno~ sooy {qso

I~okto I{yy{z F~tltt{z Stmoz o. stms

|o~yt z~o~tm o n o.nt~tl tt{z.kzn

~o|~{nm{t{z tzkzyonty. |~{tnon so{~trtzkw

kss{~ kzn{~mo k~om~onton1

Jkk Fktwklwt [koyoz> Fww~owo kz nk{k{

~o|wtmk sook~ms ttstz soykzm~ t|kznt

[||{~tzt Ozq{~ykt{z qtwo1

Lzntzt> \st{~v t|k~{qsor~kz q~{y

Lzntzr> \st{~v t|k~{q sor~kz q~{y
 L~tozn {qFzms{~ *lsk~t U{[I359665 s|>22
 q~tozn{qkz ms{~1{~r2+ *r~kz z ylo~ ZM4:4:;+.
 k~k~non {J~1Tkmwoz zkz.J~1T{qqk kznT1
 Kwlo~ro~1 J~1ctlkt o) |{kq qznon l st
 r~kz1 J~1\~t|k soo ntnz{~omot o kzq zntzr q{~ l{zmw t{z
 \so o t t z r ~o ok~ms rro o o~kw vo|{t z q{~|~{n mtzr y{~o
 ~{l o tnozm o
 kl{ sooqqom t ozo {q ol/lk on tz o~ oz t{z q{~LIZ1 Lt~.
 so onto rro sk t

t{k|~t{~t{ {lo{o~ noqtzo owtrtlwt m~t{o~tk {|~{km{t{ow tzmw{no
 |o{|wo {t{s strso~ wo{ow
 {qLIZ1 [om{zn. {so~o t{kzoon q{~w{zro~/o~y q{ww{/| kn{m{yo yok{~tzt
 |o~t{n1
 \st~n. ~o{ok~ms o{kyltztzr {so~ok{z q{~n~|{| q~{y {ol/lk{on tz{o~{oz{t{z
 q{~LIZ t
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 {stwo {ol/lk{on
 tz{o~{oz{t{z n{z{tz{w{ o{som{ {q{~kz{|~{k{t{z. {~k{owtzt {tyo.
 {kmo. o}{t|yoz.

mwokztzr. kzn{so~ o|ozo. q~so~ m{ ttw kzkwo s{wn
 lo|o~q{~yon1 Ltzkww.

q~o onto s{wn koo s{ tzo~ozt{z kmmtltwt.
 knso~ozmo. kznoqqomtozo

mkzloty|~{on km~{ ntqqo~oz tzo~ozt{z notrz. k~tzt q~{y tzozt{o
 zms~{z{

tznttnkw so~k|t/kton ol/lkon |~{r~kyyo {lwoznnon notrz m{yltztzr
 so

knkzkro {qqkmo/{/qkmo kzntzoz~zo/lko nowoyoz. {ozt~ow
 owq/ykzkron

|~{r~kyyo1

Oy|wtmk{t{z q{~mkzmo~ ~~t{~

|~{r~kyyo1

Oy|wtmk{z q{~mkzmo~ ~t{~

Joow{|tzt kznokwtztz y{~o kmmtlwo LIZ ~okyo sk o looz tnoztqton
 ky{zr

{|tzo~zk{zkw LIZ ~ook~ms |~t{~tto *[sk okw15354+1 _stwo so~o
 t{yo onozmo

skol/lkon tzo~ozt{z mkzlokqqomto kqkmo/{/qkmo
 tzo~ozt{z. m~~ozw

so~o tknok~s {qoyktm nk k kl{ so k tztstms sol/lkon
 y{nkwt |omtqt/

mkww mkzozskzmo ||{~to mk~o q{~LIZ1 Joow{|tzt vz{wonro kl{
 qqomto ol/

lkon tzo~ozt{z skty|wtmk{t{z q{~mkzmo~ ~t{~ kso

mkzlo|~o~ozon ts

y{~o kmmo~tlwo. w{/m{ kznw{//~noz {|t{z q{~ykzkrtzr qok~ {qmkzmo~

~om~~ozmo1

Oz~{nm{t{z

Lok~ {qmkzmo~ ~om~~ozmo *LIZ+ t€noqtzon k€jsoqok~. Đ{~~p {~m{zmo~z

~owk{tztzr {so|{€€t/

ltwtp sk mkzmo~ Đtwwm{yo lkmv {~|~{r~o€€) d4f1l{zoy|{~k~p nolkoe {zLIZ

moz~o

k~{zn no~o~ytztzr so~s~o€s{wn {qmwttzmkwwp €trztqtmkz LIZ d5f.ntqqo~ozmo€

loĐooz qok~ {q

Chunk 13

mkzmo~ ~om~ozmo kzn qok~ {qmkzmo~ |~{r~o€€t{z d6f.noow{|yoz kzn
~oqtzoyoz {qzoĐ
€mkwo€ q{~yok€~tzt LIZ d7f.kzn mkwwtzt q{~€|omtqtm mwtztmkw rtnowtzo€ {yzzkro
LIZ d9f1
\\so mkwwq{~rtnowtzo€ €|omtqto€ sk so~o t€kzoon {mwk~tqĐ Đsoso~ LIZ mk~o
€s{wn lo
ykmsn {so€o~tĐ {qLIZ *t1o1. z{zowoKon. owoKon. mwtztmkwwĐ
owoKon+ d9f1
[||{~tĐo mk~o q{~LIZ t€soy{€ m{yy{zwĐ ~o|{~on zyoĐ zoon {qmkzmo~
€~tĐ{~€ d:.

;f1Jo€|t~o ~o|{~on strs LIZ |~o~kwozmo Đt~stz ~k~t{~€ r~{~|€ *~kzrtzr q~{y 6=&
 ~{=;& tz
 kwwm{z~tzo~€ kzn k~kww~tyo |{tz~€ €tzmo ntkrz{€t€ d<f+. z{~oz{~rs t€vz{Đz kl{~
 Đsk~
 Đ{~v€ lo€~. Đs{ Đ{~wn lozoqt~ y{€~ q~{y LIZ tz~o~~oz~t{z€ kzn k~Đsk~ |{tz~€
 tz~somkzmo~
 |k~sĐkp ~{tz~~{n~mo ~soy1 \so~o k~okz~ylo~ {qođt€~tztzr €p€~oyk~tm kzn
 yo~k~o~toĐ€ {z
 Đol/lk€on tz~o~~oz~t{z€ q{~mkzmo~ mk~o2kq~o~mk~o d=~4;f kzn {zqok~ {qmkzmo~
 ~om~~~ozmo

tz~ozt{z€ y{~o rozo~kwwP d4<~54f1 [o~kw |€Pms{w{rtmkw tz~ozt{z€
 sk~o looz no~ow{|on
 {~on~mo LIZ Đt~s ~k~ptzr wo~ow€ {qoqqom~t~ozo€€ d43. 4=f1 N{Đo~o~. y{~o
 ok€twP kmmo€€tlwo
 €Pz~so€t€on o~tnozmo t€zoonon {~zno~€~kzn ~so~{wo {q{zwtzo tz~ozt{z€
 k€~{w€ q{~mwtzt/
 mtkz€ {knn~o€€ LIZ k~|o~~tzo~ ~tyo|{tz€ q{~|k~toz€€1
 PLOS ONE_ol/lk ~ontz~oz~ t{z~ q{~qok~ {qmkzmo~ ~om~~ozmo> F~m{|tzt
 ~o~to~

WSV[VUK s>22n{t1{~ r243146; 42u{~zkw1|{ zo13645; := U{oylo~ <.5357
 525:so~m{z~tl t {z{sok~tmwo1 \soqzno~ ntnz{
 |wk~kz~{wotzso n no trz. nk km{wwom t{z
 kznkzkw t. nomt t{z { | lwt s. {~|~o|k~k t{z {q
 soykz m~t|1
 l{y|o tztz o~o >\sok s{~ sk o nomwk~on
 sk z{m{y|o tztz o~o o t1 \st€ sk€looz o€|omtkwwP |o~ tzoztzmo
 sol{ tn/4= |kznoytm wktnlk~o sono k€k tztz
 oqqom€ {qwt yt on km mo€€ {€ kw qkmo/ /qkmo mk~o kzn €{mtkw t€{wk t{z
 {zsokw s kzōto P d55. 56f

kzn LIZ d57f1 F€€ms. tºozrozno~on k|€s {ºººtwť€o ºsoºomsz{w{rtmkw
 mk|kltwtºto€ q{~Đol/
 lk€on tzºo~kmºtºtºp {ty|~{ºo sokwºs €o~ºtmo nowtºo~p kzn tzºº~z. |kºtozº
 Đowwlotzr d59~5;f
 Joºow{|tzt kzn oºkwºkºtzt y{~o kmmo€€tlwo LIZ º~okºyozº€ sk€looz tnozºtqton
 k€º{|tzºo~zk/
 ºt{zkw LIZ ~o€ok~ms |~t{~tºto€ d5<f kzn ºso~o t€€{yo oºtnozmo ºskº {zwtzo
 nowtºo~p {qtzºo~ºoz/
 ºt{z€ ykp lok€oqqomºtºo k€qkmo {qkmo tzºo~kmºt{z d5=f1 N{Đoºo~. tºsk€looz
 z{ºon ºskº

€ty|wP m{z~tztz |~{oz qkmo/{/qkmo tz~ozt{z€ {oNokws nowt~P n{o€
 z{oø|w{t so
 qww|{oztkw {qomsz{w{rtmkw {|t{z€ d45f \st€ yokz€ sk {zwtzo
 tz~ozt{z€ €s{wn lom{z/
 €tno~on {sko zt}o qzm{t{zkwtP. kmmo€€tlwtP kzn w{zro{tP k€|om€
 sk ~o}t~o mw{€o~
 tz{o€trkt{z tz{~no~ {ozskzmo sot~ k||wtmkltwtP kzn lozoqt€ {o{|wo
 ø|o~tozmtzt LIZ1
 V~ ~o{toĐ knn~o€€€ krk|tzt~o~k~o tzq{~ Đkp€> 4+tq{m€€
 ømw€t{owP {zĐol/nowt/

o~on tz~o~oz~t{z€ Đt~s kq{m~€ {zLIZ ~ork~nwo€€ {q~sot~ |€Pms{w{rtmkw
 q~kyoĐ{~v. 5+|~o€/

oz~€ ~soođt€~t~r o~tnozmo {z{~m{yo€ {q€~nto€ {ztz~o~oz~t{z€ q{~k~t{~€
 wo~ow€ {qLIZ

€o~o~t~p. 6+knn~o€€o€ z{~{zwp Đstms |€Pms{w{rtmkw q~kyoĐ{~v€ q{~LIZ
 tz~o~oz~t{z€ k~o

oqqom~t~o q{~~on~m~t{z {qLIZ l~kw€{ Đso~so~ ~so~o t€kzP~k~tkltwt~p
 tz~so€~t~kltwt~p {q~so€o

|€Pms{w{rtmkw q~kyoĐ{~v€ *o1r1 lG\. Fl\. ytnq~wzo€€. o~m1+ q{~Đol/nowt~o~p? kzn
 7+strs/

wtrs€ ¤so¤zt}¤o k€|om¤€ {q{zwtzo tz¤o~¤oz¤t{z no€trz kzn nowt¤o~p ¤sk¤ ytrs¤
 ozskzmo ¤sot~
 k||wtmkltwt¤p tz€¤||{~¤t¤o mkzmo~ mk~o1
 \so~o k~o¤k~t{¤€ noqtzt¤t{z€ {q¤soy{no€ {qnowt¤o~p {q¤sotz¤o~¤oz¤t{z€ ¤sk¤.
 l~{knwP
 €|okvtzr. k~oz{¤qkmo/¤{/qkmo. €¤ms k€Đol/lk€on. ~oy{¤o. ntrt¤kw. yNokw¤s. oNokw¤s.
 o¤m1l{z/
 €t€¤oz¤ noqtzt¤t{z€ kzn m{z¤tz¤{¤€ no¤ow{|yoz¤€ {qmwk€€tqtmk¤t{z {q¤so€o
 tz¤o~¤oz¤t{z€ t€
 tzm~ok€tzwP ty|{~¤kz¤ k€¤so€o ¤k~t{¤€ y{nkwt¤to€ {qtz¤o~¤oz¤t{z€
 |~{wtqo~k¤o1 U{¤klwo

koy| k~oykno {n{€{lPTkt€ okw1d45f kzn [v~klkw/Z{€€ okw1d46f1 \so q{m€
 {q{~
 ~otoĐ t€Đol/lk€on tzo~ozt{z€ q{~LIZ1 V~ noqtzt{t{z {qĐol/lk€on tzo~ozt{z€
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 l{s €pzms~{z{€ *tzo~kmtto yoo€tze Đt{s z~€o€. |sp€tmtkz€ kzn |oo~€+ kzn
 k€pzms~{z{€
 *|~o/~om{~non kwv€. €owq/rtnon tzq{~ykt{z Đol€to€. n{Đzw{knklwo ntrtkw
 yko~tkw. kzn
 €yk~|s{zo k||€+ y{no€ {qnowto~p {qsotzo~ozt{z tkkntrtkwwp ozklwon kzn
 tzo~zon

ktnon |wkq{~y1 _oDtwwtzmnolwoznontzo~ozt{z€ *qkmo/{/qkmo €o€€t{z€
 tzm{yltzkt{z
 Dt{s {zwtzo nowto~p {qykto~tkw kzn2{~ owosokws €o€€t{z€+. Dt{s ktoD
 {qnt€m€€tztso
 knnon lozoqt€ kzn k~t€tzt mskwwozro€ {qsontrtkwwp ozklwon m{y|{zoz
 {qsotztto~ozt{z1
 Vluomtto€
 \so {luomtto {qst€€m{|tzt ~otoD t€{|~{tno kz{to~toD {qsokktwklwo
 otnozmo {zso
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ty|~{oyoz q{~Dol/lk€on tz~ozt{z€ tnozqtqton tzso~otoDon €nto€1 \st€
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 *5+mkzmo~ kzn *6+
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PLOS ONE_ol/lk ontzo~oz t{z q{~qok~ {qmkzmo~ ~om~~ozmo> Fm{|tzt
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 WSV[VUK s|>22n{t1{~ r243146; 42u{~zkw1|{ zo13645; := U{oylo~ <.5357 625:
 W~oqo~~on Zo|{~tzt Oy q{~[poyk~tm ~oto kzn Tok/Fzkwpeo oöozt{z
 q{~m{|tzt
 Zoto *WZO[TF/[mZ+ Isomvwt. Dstms mkzloq{zn tz[4Isomvwt1
 Ozmwt{z kzn oömw{t{z m~to~tk
 \so ok~ms ktyon {tnoztq Kzrwts wkzrkro *4+|oo~/~otoDon *5+wt~o~k~o
 ~o|{~tzt nk

q~{y }kwtkto. }kztktok kzn ytðon/yo{s{n€ €nto€ m{zmo~ztzr
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 \so~o ðk€z{~o€~tm~t{z {zmkzmo~ p|o. mkzmo~ €kro. tyo €tzmo ntkrz{€t€.
 ~ok~yoz~ p|o. {~
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 5357. Đts{ knk
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 ~omozmP {qso
 oyo~rozmo {qtz~o~o€ tzLIZ k€kz{zm{/€{mtkw |soz{yoz{z kzn so|~{wtqo~kt{z
 {qntrtkwwP
 ozklwon tz~o~ozt{z€1 Fwwowtrtlwo k~tmwo€ Đo~o tzmwnon tzso~otoĐ
 ~ork~nwo€€ {q}kwtP
 k€€o€€yoz ~ktzr k€k€€o€€yoz {qso}kwtP {q€~nto€ n{o€ z{q{~y |k~
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~o~toĐ ~oyt d63f1 Kđmw~non €~nto€> z{~/|oo~ ~o~toĐon. m{yyoz~k~p.
 ont{~tkw€ kzn {|tzt{z
 |k|o~. m{zqo~ozmo kl€~km~€. €~n~p |~{~{m{w€. €~nto€ z{~tzKzrwt€s wkzr~kro1
 \so wt~o~k~~o
 €ok~ms qw{Đmsk~ mkzloq{~zn tzLtr41
 Jk~k ođ~km~t{z kzn €pz~soft€
 Jk~k Đk€ođ~km~on ~t~tr ~so[WOJKZ q~kyoĐ{~v *€ky|wo. |soz{yoz{z {qtz~o~o€.~.
 no~tr~.
 o~kw~k~t{z kzn ~o€ok~ms ~p|o+ d64f1 L{~okms €~n~p. ~soq{ww{Đt~tr tzq{~yk~t{z
 Đo~o ođ~km~on>

kss{~. pok~ {q|lwtkmkt{z. m{z~p. €n no€tr. €ky|wo €tpo. mkzmo~ p|o.
 €oð{q|k~tmt|kz€.

LIZ yok~o. tzo~ozt{z qok~o€1 Fqwwoð~okntzr {qokms |k|o~ kw€{
 kww{Don {||ww {

sovpqtzntzr€ kzn yo€€kro€ ~ork~ntzr sokw~o kzn |tqkww€ {q€tr {zwtzo y{no
 {qnowt~p

q{~sotz~ozt{z€1 \so oð~km~on nk kzn {~kww oð~Do~o kzkwp€on
 €tr ksoyk~tm kzkwp/

€t€q~kyoD{~v d65f1 \so qtzkw €o{qsoyo€ Đk€~o~toDon kzn no~o~ytzon lpkwwyoylo~€
 {q

so~o€ok~ms oky1

Zo~w~

so~o€ok~ms oky1

Zoww

F{kw {q67|k|o~€ ~o|{~tzt {z5<ntqqo~oz tzo~ozt{z€ k~otzmwnon
 tzst€~otoĐ1 Fww{q

soy Do~o tnozttqton qt~€ tztsonkkk€o €ok~mso€ kzn z{zoĐ €nto€ Do~o
 tnozttqton tzso

ykzkw ~oqo~ozmo wt€€ok~ms1

[nnP msk~kmo~t€tm€

Vqsotzmwnon tzo~ozt{z€. 49Do~o o€on €tzt k~kzn{ytpon m{z~{wwon
 ~tkw *Zl\+ no€trz

d4=. 66~7:f kzn 43d7;~9:f Do~o k~tkt{z€ {qnoow{|yoz. |tw{ qok€ltwtP.
 €kltwtP kzn €k€t€/

qkm{t{z €nto€1 _okw€{ tzmwnon {zo}kwt{kto €np kl{ mkzmo~
 €~t{~€) oð|o~tozmo {q
 |k~tmt|k{t{zr tzk{t~kw m{rztto losk{t{~kw so~k|p/lk€on owo|s{zo
 m{kmstzr |~{r~ky q{~
 qok~ {q~om~~ozmo. klkzkntkz r{o~zyoz q{znnon G{o~zmoGkmv |~{r~ky d9;f1 Vzo
 Đk€k|~{/
 €|omto {l€o~k{t{zkw €np d9<f lk€on {zk€om{znk~p kzkwp€t€ {q~tkw nk.
 kzn {zoĐk€k
 }k€t/oð|o~tyozkw ytðon/yo{s{n€ €np d9=f
 V {qso49ZI\€. Dowo d66. 67.6;.6=~75. 77~7.: :3.:4fsknkz{/tzo~ozt{z
 m{z~{w

*~ok~yoz~ k€€€kw *~F]++1 Vzo {~{q~so€o ~Dow~o €~~nto€. {zod67f
 sknkzknnt~t{zkw km~t~o
 tz~o~~oz~t{z k~y~qkmo/~{/qkmo ytnq~wzo€€/lk€on m{rzt~t~o ~so~k|p *TGI\+
 |~{r~ky1 \D{
 €~~nto€ d69. 6:fsknkm{z~~{w m{znt~t{z {qk€wtrs~w~p kw~o~on ~o€~on
 tz~o~~oz~t{z1 OzL{Z~t~no
 ~tkw d76f.~so m{z~~{w r~{~| ~omot~on sokw~s ykzkroyoz~ m{z~oz~1
 PLOS ONE_ol/lk ~ontz~o~~oz~ t{z~ q{~qok~ {qmkzmo~ ~om~~~ozmo> F~m{|t~r
 ~o~to~

WSV[VUK s|>22n{t1{~ r243146; 42u{~zkw1|{ zo13645; := U{oylo~ <.5357 725:
 V {qso43qok€ltltwtP €nto€. d7;. 7=.93.95~9:. :5fztzo Do~o k€tzw/r~{
 |~o€/
 |{€/o€ |tw{ kzn {zoDk€k}k€t/ođ|o~tyozkw oqqomtoozo€. kmmo|kzmo kzn
 €kt€qkm{z
 €nP d9=f1 \so kq{~oyozt{zon }k€t/ođ|o~tyozkw €nP sknk~okyoz
 k€€kw m{z~{w
 k~y lskn{{yt ~kzn{yt€kt{z no{k€ykw €ky|wo {q|k~tmt|kz€1
 T{€ {qso€o €nto€ Do~o ytđon }kztktto €nto€ Dt s k}kwtktto
 owoyoz. olr1kz

tz{o~toD |{€/tz{o~ozt{z1 T{€ m{yy{z m{z~to€ q{~so€€nto€ Do~o
 Uo{so~wkzn€ *zB:+.

F€~kwtk *zB:+kzn][F *zB9+1\so ~o€{q{so€€nto€ Do~o lk€on tzMo~ykzP *zB6+.\kt/
 Đkz *zB4+kzn Qk|kz *zB5+.]R*zB4+.\kzknk *zB4+.[Đt{po~wkzn *zB4+.\lstzk *zB4+.

Jozyk~v *zB4+1\so msk~km{o~t€tm€ {q{sotzmw{non €€nto€ k~o|~o€oz{on tz\klwo
 41

L~{y {soođ~km{on nk{k Đotnoz{tqton €tđvoP{soyo€ {sk{ Đtwwlo|~o€oz{on
 tz{st€~o{toĐ>

LIZ yok€~o€ €on. m{z€tno~k{t{z€ kl{ € k~ro |{|wk{t{z€ q{~Đol/lk€on
 tz~o~oz{t{z? €oms/
 z{w{rtmkw mskwwozro€? ty|~{t{zr knso~ozmo? ty|woyoz{t{zr tz~o~oz{t{z€ tzođt€t{zr
 |k{sĐkĐ€
 kzn ms{{€t{zr kso{~o{tmkw q~kyoĐ{~v q{~tz~o~oz{t{z€1 \so q{ww{Đt{zr
 nt€m€€t{z t€€~m~on
 soyk{tmkwwĐ1
 W{|wk{t{z msk~km~o~t€tm€
 \so |{|wk{t{z msk~km~o~t€tm€ {q{sotzmwnon €€nto€ k~o~o|{~on tz\klwo
 41T{€€ {qso
 €€nto€ q{m€on {z|o{|wo sk sknsknmkzmo~ kzn Đo~o m~~ozwĐ q~oo
 {qnt€ok€o *zB54+1

[ooz d67. 69.97.99.9;~9=f €nto€ tz{wo |k~tmt|kz€ Đs{ k~om~~ozwp wt€tzt
 Đt€s mkzmo~1
 T{€€ €nto€ sknqoykwo {zwp |k~tmt|kz€ *zB49+q{ww{Đon lPl{€s ykwo kzn qoykwo
 *zB44+
 kzn Đ{€nto€ skn{zwp ykwo |k~tmt|kz€ d7;. 7<f1 T{€€ €nto€ q{m€on
 {z|ktoz€ Đt€s
 Ltr41Sto~k~~o €ok~ms qw{Đmsk~ 1
 s~|~>22n {t1{~r243146;42u {~zkw1|{z o13645;:=1r3 34
 PLOS ONE_ol/lk ontz~o~oz t{z q{~qok~ {qmkzmo~ ~om~~ozmo> Fm{|tzt
 ~o~to~

WSV[VUK s|>22n{t1{~ r243146; 42u{~zkw1|{ zo13645; := U{oylo~ <.5357 925:
 \klwo 41Ozmwnon €np msk~kmo~t€ tm€1
 [np {~tzo~ozt {z
 zkyo? F~tmwo€ >kss{~€.

pok~ {q|lwtmkt{z.

m{z~p[np p|o [ky|wo €tpo.

rozno~. yokz

krolkzmo~ p|o2€kro \so{~o tm kw

q~kyoĐ{~ v2lk€o q{~

m{zozOzo~ozt{ znwto~p j~kt{z .q~o}oz mP

4 GZKF\N kznosz Go~r

okw1*5349+. Uo so~wkz n€

d66fZI\ 493qoykwo€

yokz kro

9314<+G~ok€ mkzmo~.

m{y|wo onm~kt o

tzoz ~ok yozIG\ kzn

m{y|wo onm~kto
 tzoz ~okyoziG\ kzn
 |Epm{s{on mk{t{z[owq/ykz kron ÐolEt o {z
 ok~wP €~t{~Est|
 *tzq{~yk t{z. s{yoÐ{ ~v.
 k€€o€€yo zDt s k{yk on
 qoonlkmv+4:Ðoov€. ÐoovwP
 y{nwo€1
 5 GoTtzn ZI\ 579> 543
 qoykwo€ .69
 ykwo€1 Tokz
 kro941;1^k~t{€ mkzmo~€?
 €kro€ 4~7?
 ~omottztz2k qo~
 |~tyk~P ~okyoziTtznqwzo €/lk€on
 IG_olEt o. oyktw€ Dt s
 so~k|t€. knt{ ~om{~ntzr.
 nktwP yontkkt{z oÐo~mt€o€ 1Ktrs Ðoov€. ÐoovwP
 y{nwo€. ÐoovwP
 oyktw€ Dt s so~k|t€1l{y|oz okw1*534<+?
 d5=f

oyktw€ Đt s so~k|t€1l{y|oz o kw1*534<+?

d5=f

Gt€€owwtzr o kw1*534<+?

d:6f

Itwwo€€oz o kw1*5353+.

Uo so~wkzn€ d:7f

6 M~k t t no/o wtmt t z r

Đ~t t z r t z o~ oz t {z

V { o kw1*534:+.][F

d69fZl\ ::qoykwo€.

yokz kro

9:1<=Kk~w p/€ k rol~ok€

mkzmo~ *noqtzon k€

[kro 3dn m kw2

w{l wk~ mk~mtz{yk

tz€t f. [kro O.

[kro OO.{~[kro

OOO F+W{€t t o |€pms{w{r p.

r~k t t no[owq/ykz kron. Đol/lk€on

nowt o~on |~{y| €€ {Đ~t o

kwo o~ {qr~k t t n o {k

|o~€{z {q so|k~ tmt|kz €)

ms{tmo. Đoovw p

|o~€{z {qso|k~tmt|kz €)

ms{tmo. DoovwP

}o€t{zz kt~o€[töDoov€. 43

ytzoo€ |o~Doov

-tyo q{~

}o€t{zzk t~o€1

7 FOT/LGIZ Stmsoz skw

okw1*534;+.][F d6:fZI\ 443qoykwo€.

yokz kro991<€kro 3{€kro 000

l~ok€ mkzmo~ DtS

z{st€{~P {qnt€ok€o

~om~~ozmo {~

yo€k€k€ o€kzn Ds{

m{y|wo onkmto

~okyo€ 6y{zS€

|~t{~l{rztto ltk€

y{ntqtmkt{zOznttnk wwPktw{~o n

m{y|oo~ nowt~on

m{rztto ltk€ y{ntqtmkt{z

oöo~mt€o€L{~ Doov€. otrs

€o€€t{z€ *Dtmo k

Doov+. 63ytzoo€

okms1

9 [_VZ] kzno_kw

Chunk 41

Doov+. 63ytz o€
 okms1
 9 [_VZ] kzno_kw
 o kw1*534;+? d6;fZI\ <<174ykwo€.

7;qoykwo€1
 yokz kroq{~
 9<^k~t{ € mkzmo~
 € ~ t { ~ € q ~ { y :
 y { z s € { 9pok ~ €
 kq o ~ mkzmo~
 ~ ok yoz Gwoznnon IG\ Gwoznnon tz o ~ oz t { z > qkmo/
 { / qkmo € o € t { z €. m { yltzon
 Dt s s ~ oo 49/ytz oo/
 m { z € w k t { z € 45Doov€
 G ~ y o kw1*534=+.

Uo so ~ wkzn€ d6<f
 : TtznVzwtzo Z € € oww
 o kw1*534=+. F € ~ kwtk
 d6=fZI\ :=*yokz kro
 9617. 97&
 qoykwo+kyowkz{y k
 ntkrz{ € t € { q € kro
 5m.6k.6l{~6m.
 m { y | wo on sot ~ wk €
 ~ ok yoz Dt stz

m{y|wo on sot~ wk€
 ~ok yoz Dt stz
 so|k€ 9pok~€Ttnq wzo €€ [owq/r tnon Dol€t o *€s{~
 tno{€. r tnon yontk t{ z€+[tðDoov€. DoovwP
 y{n wo€
 ; IFZK[\ *So€€ qok~
 Fq o~ lkzmo~+ kz
 Nowy{zn o kw1*5353+.
 Uo so~wkzn€ d73fZI\ 5:5qoykwo€.
 yokz kro991<ntkrz{€t€ {ql~ok€
 mkzmo~ 4 {9pok~€
 kr{. z{€trz€ {q
 w{mkw {~~ort{zkw
 ~om~~ozmo {~
 yo k€k€ tmnt€ok€olG\ [owq/r tnon Dol€t o1 Kyktw
 m{kms k ktwklwo q{~|o{|wo
 Ds{ oðstlt on kzoon q{~t 17~:Doov€ m{~€o
 < Nokw sP wt tztzr Dt s
 l~ok€ mkzmo~ *[IW/F+

< Nokw sP wt tztzr Dt s
 l~ok€ mkzmo~ *[IW/F+
 Lkzr o kw1*45353+. d74f
 \ktDkzZI\ 4:9qoykwo€.
 yokz kro
 94199Jtkrz{€t €{ql~ok€
 mkzmo~. sk tztzr
 m{y|wo on sot~
 |~tyk~P ~ok yoz
 l wo€€ skz 9pok~€
 Dt s{ k€trz {q
 ~om~~ozmo[~t{~€st|
 on mk t{z[~t{~ €st| mk~o |wkz
 m{y| o~tpon k||* ođ kzn
 tno{€+Lt o Doov€. €o oz
 y{n wo€
 *Continued +
 PLOS ONE_ol/lk ontz o~oz t{z q{~qok~ {qmkzmo~ ~om~~ozmo> Fm{|tztzr
 ~o to

WSV[VUK s|>22n{t1{~ r243146; 42u{~zkw1|{ zo13645; := U{oylo~ <.5357 :25:
 \klwo 41*I{z tz on+
 [np {~tz o~ oz t {z
 zkyo? F~tmwo€ >k s{~€.

pok~ {q|lwtmk t{z.

m{z~p[np p|o [ky|wo €tpo.

rozno~. yokz

krolkzmo~ p|o2€ kro \so{~o tm kw

q~kyoĐ{~ v2lk€o q{~

m{z oz Oz o~ oz t{ znowt o~p j~k t{z .q~o} oz mP

= tlkzFJFW\ Kk~wP

T~|sP o kw1*5353+.

d75fZI\ 447*434

qoykwo€ .46

ykwo€+. yokz

kro9615=Ttðon k~t{€ € kro

mkzmo~€lG\ [owq/ykz kron. mwtztmtkz

€|o~ t€on Đol€t o * ođ.

€|o~t€on Đol€t*ođ.
 tno{. knt{. s{yoĐ{~v+4:Đoov€. otrs
 wo€€{z€
 Jkto€ okw1*5355+.
 F€~kwtk d:9f
 43 L{Zttno_krzo~ okw1
 *5354+.][F d76fZI\ 4=:qoykwo€.
 yokz kro971;[kro 3/000 l~ok€
 mkzmo~ kntkrz{€t€ .
 m{y|wo t{z{q
 |~tyk~p l~ok€
 mkzmo~ ~ok~yoz
 4~43 pok~€ loq{~o
 m{z€oz*m~~oz
 s{~y{zkw ~ok~yoz
 kww{Đon+ .nt€ok€o
 q~oolG\ oNokw~s Đol€tĐt~s
 ntnkm~tm m{z~oz. tz~o~km~t~o
 ~{w€ kzn tz~o~km~t~o
 yo€€krtzr qok~o. kw€{ ~owo
 m{kmstzr1L{~ Đoov€. Đol€t~o
 ~|nk~on ~s~oo ~tyo€

m{kmstzr1L{~ Ðoov€. Ðol€t^o
 |nk^{on} s~oo tyo€
 kÐoov. q{~ Ðoovwþ
 owo|s{zo mkww€.

44 Tþ/MTI ^t€€o~ o^{kw1}

*534<+. Uo^{so~wkzn}€ d77fZI\ 43=qoykwo€.

yokz kro991<1G~ok€^{mkzmo~}

ntkrz{€t€ .|~tyk~þ

~ok^{yozy}

m{y|wo^{onk^{y{€ 9}}

þok~€ kr{M~{^{| yontmkw}

m{z€^{w^{k^{t{ z€kzn}}}

klwo^{/lk€o nÐol/}

lk€on €^{||{~^{r~{[|]}}

€o€€t{z€^tno{ m{zqo~ozmtz rkzn

klwo^{/lk€o nÐol/lk€on k||}

*^{tno{€. €~^{t{~€st|}}

tzq{~yk^{t{z+ kzn s~oo}

Ðol/lk€on €^{||{~}

€o€€t{z€1\s~oo r~{[|]

yoo^{tzr€ {^{o~ s~oo}}

y{z^{s€. :3ytz^{o€}}

okms1

Chunk 47

yoo✧tze {✧o~ ✧s~oo
y{z✧s€. :3ytz✧✧o€
okms1
45 Vzwtzo ytnq✧w zo€€
lk€on tz✧o~✧oz✧t {z1
Wozr o✧kw1*5355+. Istzk
d79fZI\ :3qoykwo€.
kron 4<~:9
pok~€[✧kro O/O^ l~ok€✧
mkzmo~ ntkrz{€t€.
m{y|wo✧ t{z{qkww
✧~ok✧yoz✧ €Đt✧s ✧so
ođmo|✧t{z {q
s{~y{zkw {~
No~mo|✧tz ✧so~k|p
kzn z{mkzmo~
~om✧~~ozmo {~
yo✧k€✧k€ t€Ttnq✧wzo €€/lk€on
m{✧~€oVzwtzo m{✧~€o nowt✧o~on tz
r~{✧| €o€€t{z€?
k€€trzy oz✧€ q{~s{yo
|~km✧tmo *63ytz€ |o~nkp+
kmm{y|kzto nlP✧so
~om{~ntze {q9Wyontmkw
k||*kzk||✧{|~{y{✧o

~om{~ntzr€ {q9Wyontmkw
 k||*kzk||{~{y{o
 ytn kzn l~ktz sokw s kzn
 mwtko sk||tzo€€+[tðDoov€. {zmo
 DoovwP r~{
 €o€€t{z€. 4.9sokms1
 45 l{z}o~Lok ~/M~{1
 \klo~ okw1*5356+.
 Jзык~v d:3fZI\ <9qoykwo€.

yokz kro97191G~ok€ mkzmo~
 €~t{~€ Đs{ skn
 m{y|wo on|~tyk~P
 ~okyozy 6
 y{zs€ ~9Pok~€
 |~ot{€ wP.Đo~o
 4< POK~€. kzn
 €m{~on55 {zso
 Lok~ {qlkzmo~
 Zom~~ozmo
 Ozoz{~P ~[s{~
 L{~y *LIZO/[L+1[o€€t{z€ q{m€tztz {z
 yo km{rzt t o
 €~korto€. kw o€/

mwk~tqtmkt{z. kzn
 onmk{z kl{

mwk~tqtmk{t{z. kzn

onmk{t{z kl{

q{ww{D/| losk{t{~+1Vzwtzo nowt{o~on r~{

€o€€t{z€[tðDoov€ {kw{zo

4½s{~ tznttnkw

€o€€t{z q{ww{Don lp

qt{oDoovwP 5/s

r~{ €o€€t{z€1

N{yo oðo~mt€o€ kzn

~okntzr yk{o~tkw€ 1

47 Rktvo€€ k|| kzn Mozvt

k|| *Mozvt yokz€

ozo~rP {~t{kw{P tz

Qk|kzo€o. *Fvomst o{kw1

5356+. Qk|kz d7:fZI\ 77;qoykwo€.

yontkz kro

791kro53~7= pok~€. 4

pok~ kq{o~ l~ok€

€~ro~p. m~~ozwP

nt€ok€o/q~ oo1Rktvo€€ k||

|~{lwoy €{w{tzr

{so~k|p1 Mozvt k||~

losk{t{~kw

|~{lwoy €{w~tztzr

so~k|p1 Mozvt k||~

losk~t{~kw

km~t~k~t{z\so Rktvo~€~ /F||

m{y|~t€on ztzo €o€€t{z€1

Kkms €o€€t{z ~{v

k||~{öty k~owp 43ytz~o€

{m{y|wo~ o1\so Mozvt/

F|| m{y|~t €on€tö€o€€t{z€ .

Đt~s k||~{ötyk~ow p43

ytz~o€ zoonon ~{

m{y|wo~o okms €o€€t{z1<Đoov€

*Continued +

PLOS ONE_ol/lk ~ontz~o~oz~ t{z~ q{~qok~ {qmkzmo~ ~om~ozmo> F~m{|tztzr

~o~to~

WSV[VUK ~s~|~>22n{t1{~ r243146; 42u{~zkw1|{ zo13645; := U{~oylo~ <.5357 ;25:

\klwo 41*I{z~tz~ on+

[~n~p {~tz~o~oz~t {z

[~n {~tz~ozt {z
 zkyo? F~tmwo€ >k~s{~€.

pok~ {q|lwtmkt{z.

m{z~p[~n ~p|o [ky|wo €tpo.

rozno~. yokz

krolkzmo~ ~p|o2€~kro \so{~o~tm kw

q~kyoĐ{~ v2lk€o q{~

m{z~oz~Oz~o~ozt{ znowt~o~p j~kt{z .q~o}~oz mb

49 ~So€€ qok~ kq~o~

mkzmo~~CEM~ tnon {zwtzo

|~tyk~p mk~o

tz~o~oz~t {z*S~truo€/

N~tpo~ o~kw5356+.

Uo~so~wkzn€ d:4fZI\ 4;;

|k~~tmt|kz ~€

*464 Đ{yoz

kzn 6:yoz+

yokz kro96161kn~w~ *~4< pok~€+

mkzmo~ €~~t~{~€

Đs{ skn *k+qtzt€son

€~mmo€€q~ wm~~kt~o

mkzmo~ ~~ok~yoz~

lo~Đooz 6y{z~s€

Chunk 52

mkzmo~ ♡~ok♡yoz♡

lo♡Dooz 6y{z♡s€

kzn43 pok~€ kr{. *l+

Đkz♡on €♡||{~♡ q{~

LIZ. kzn *m+skn

€♡qqtmtoz♡ J♡♡ms

~okntzr kzn Đ~t♡tzr

€vtww€1m{rzt♡t♡o losk♡t{♡~kw

♡so~k|p kzn ♡so

y{now {zLIZ lp

Soo/Q{zo€* 4==;+Ozq{~yk♡t {z♡tno{€.

ođo~mt€o€. ♡s~oo ♡{qt♡o

63/ytz ♡tno{ mkwwtzr

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 lP<Doov€ *zB7+d67. 7:..93.96f. 7Doov€ *zB6+d6:.. 76.9<f. 43Doov€ *zB5+d99. :4f. 45

Doov€ *zB4+d6;f. 9Doov€ *zB5+d74. 9=f? 4:Doov€ *zB5+d66. 75f? 5Doov€ *zB4+d:5f1
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$$\exists k \in \{ \text{?} \} \text{ so } \sim \exists t \in \mathcal{O}_Z \{$$

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$\diamond \circ z \diamond t \{ z * \epsilon p z m s \sim \{ z \{ \diamond \in \{ \sim k \epsilon p z m s \sim \{ z \{ \diamond \in + q \sim \{ y k q k y t w t k \sim s \{ y o \epsilon o \diamond \diamond t z r ? \} \sim \{ \diamond t n t z r$

$$\in \{m, t, k, w, \diamond, k, w, t, n, k, /$$

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41 {zloskwq {qso]zt~t {qV~k Lok~ {qlkzmo~ Zom~~oz mol{ww{}}t
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 F~r? 57*<+>65: 9~<1

s~|>22n{t1{~ r2431433 ;2~33953 /34:/65;5/9 WTOJ> 5;4:=;36

51 T~ko~ G.G~{ W.Jtzvow F.N~y|s~t M.Tkso I.V~kvtzmt
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 *5+>763~:1 s|>22n{t1{ ~r243143352|{ z195<6 WTOJ> 64;465;=
 61 I{ /Gktz J.[sk~|o S.W~knskz W.Zoww N.Noksm{o SI.l{k J1F~oqok~
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 71 N y|s~t MT. _k{z K.[sk~|o T.Vkvztzmt M1]ztntyoz t{z kwmkwo q{~qok~
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 91 Nkww JS._krzo~ SO.Solow [.yt𐀀s FGoz. Go~ro~{𐀀 Ij. Wk~v KZ1M𐀀tnowtzo 𐀀zoonon
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 41<44:35 WTOJ> 67=9:36 6
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 5349 Tk~? =<*6+>5<6~ =91
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431 Nkww JS.Slo~{ IT. Wstw|{ SS.[{zr Z.Wk~v KZ.bos Mb1 Ttzn/l{
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 534< U{? 5;*44+>597 :~9<1
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 441 \~tlo~t [.k~t{zt S.[ol~t ^.W~k~o~{ ztM1oNokw~s q{~ty|~{~tztz }~kwt~
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451 TkQt Q.[oQwkv T.[woQkmv{k F.[Q{l{n kT.[ØQyom ZlTtnqQwzo QQ/GkQon
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_tQs lkzmo ~QtkoNokwQs kznT{ltwo NokwQs> [QQQoykQtm ZoQtoQ kzn[QzQsoQtQ
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ZoQok~ms1 QTon OzQo~zo QZoQ1 5353 U{Q 4:?55*44+>o53 ;3=1 sQQ|Q>22
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664=:795

461 [v~klkw Z{QQ a.MQzz RT. VwQo~ O._twwoyQ ZF.Somszo~ S.ToQQo~Q
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 471 Itzmtnnk I.Wt{wt [LT. W~k o{z tM1Zoy{o Wms{w{rt mkwOz o~ oz t
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69347=9:

491 R{mċ.Rk|wkz K.\kz~ǒo~nt J1\so oqqomġtġozo ġġ{qġowosok wġs|~{r~kyġ
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 5?469;;6 6a5443:=:1 sġġ|ġ>22
 n{t1{~r243144 ;;2469;;66a 5443:=::6 WTOJ> 6943<464
 4:1 Lkz T._kzr b.csozr S.lġtT.cs{ġ a.Stġc1Kqqomġtġozo ġġ{q{zwtzo ytnqġwzo
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s|>22n{t1{~ r243143= 62uum{2skn4 34WTOJ> 6;9::9 <;
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 toonto1 Qlkzmo ~[~t Zo W~km1 5346
 [o|? ;*6+>633~5 51s|>22 n{t1{~r243143 3;244;; 7/346/35; 5/WTOJ> 567;96 =<
 4=1 \klo~ UTV)\{{wo T[. Jtzvow F.Mkwtmk Q.Ny| s~tM.Solow [.okw1Kqqom
 {qWms{w{rt mkwOzo~oz/
 t{z{zLok~ {qlkzmo ~Zom~~oz mo>F[ooyk~tm Zo~to knnTo~k/Fzk w~t1
 Qlwztz Vzm{w VqqQFy
 [{m lwztz Vzm{w1 534= U{ 4?6;*64+>5<= =~=491 s|>22n{t1{~ r2431453
 32QIV14=133 9;5WTOJ> 64965; 59

531 STT. [tks ZIQ. Sky F[S. Isozr RRL1 \so oqqom {q|ms{w{rtmk wtz~oz t{z {zqok~ {qmkzmo~
 ~om~~ozmo tzi~ok mkzmo~ ~t{~ >Foyk~tm ~oto
 kznyok/kzkw t1QFn U~1 5355 Vm?
 ;<*43+>63: =~<51 s|>22 n{t1{~r243144 442ukz14 9654 WTOJ> 69:=:649
 541 Wk|o~k vW.Qkũ~v{ kF.Zknozvk Q1\so~k|o~tm tzo~ozt{z tzqok~
 {qmkzmo~ ~om~~ozmo tzknw
 {zm{w{r |ktoz> koyk~tm ~oto1 Qlkzmo~ [|~t dOzo~zof1 5355
 Vm5<dmt~on 5356 F~r 49f?

Fk¹twklwo q~{y> s¹¹|¹>22wtzv1¹ |~tzro~1m{y 2431433;2¹4 4;;7/355/ 345;;/¹ WTOJ>
 6:63;; 44
 551 Uovsw¹¹n{¹ S.J¹¹tu¹¹ [.N¹¹n¹{z [¹^.Q{zo¹ QT.Ro{rs Q.S{¹o G.o¹kw1Fnn~o¹¹t
 zr¹sozoon¹ {qmkzmo~
¹¹~¹t¹{~¹ n¹~t¹zr ¹solV^OJ/4= |kznoyt m1Qlkzmo~ [¹~¹t¹1 5353 Vm¹? 47*9+>:34~
 :1s¹¹|¹>22n{t1{~ r2431
 433;2¹44 ;;7/353/3 3<<7/¹ WTOJ> 65669<93
 561 Urj_S. Iskz LNL. Gk~~¹ \Q.Sky l.Is{zr lb.R{v NI[. o¹kw1W¹¹ms{w{rt mkwnt¹¹~o¹¹
 n¹~t¹zr ¹so

534= I{~{zk~ Jt~ok~o *IV^OJ /4=+ |kznoyt mky{zr mkzmo~ ~t{~
 kznsokw~s~ m{z~{w~1 W~/
 ms{{zm{w{ r~15353 [o|? 5=*+=>46<3 ~61s~|>22n{t1{~ r2431433 52|{z1976; WTOJ>
 657=;696
 571 Rk~wwk~K~.Ton~ok L.Jo~rtIS1Vz~|{|q~sk~kww.z{~ I{~tn/4=. ~{{1F~m{|tzt
 ~o~to~ {q~|omtqtmt~to~ kzn
 m{~~owk~o~ {qqok~ {qmkzmo~ ~om~~~ozmo tzt~ok~ mkzmo~ |k~toz~ n~tzt
 IV^OJ/4= 1\so G~ok~1 5355
 F|~? :5>456~671
 591 O~ozrk~ R.Tkl~{~ vF.Qktz ^R.^ozvk~o~k zF.^kt~s~k Z1Sok~ztzt {||{~~zt~to
 ~q~{y IV^OJ/4= kzn

q~o oqqom {zsokws mk~o oy1 Jtklo To kl [zn~ lwtz Zo Zo1
 5353 [o|? 47*9+>=76~ :1
 s|>22n{t1{~ r2431434 :2u1n15353 13:136: WTOJ> 659==966
 5:1 Wto~mo G[.Wo~~tz WG.\wo~ IT. TmRoo MG. _k{z QJ1\so IV^OJ/4= owo|ms{
 w{r ~o{w?t{z> F
 zk{t{zkw n {q|kznoyt m/lkon mskzro tz]1[1 yozkw sokws mk~o nowt~
 1FyWms{ w15354 Qkz?
 ;:*4+>47~5 91s|>22n{ t1{~r2431436; 2ky|3333 ;55WTOJ> 65<4:9 36

5;1 Wk~v KZ.lstwo I.ltzmt~t|tz tWT. L{wo RS.Lmt{ ST.Nkk Q[.okw1Oy|km {qsolV^Oj/4= |kz/

noytm {zowosokws ~ook~ms tzmkzmo~ |~oozt {zkznmk~o> Fmkww{ktz

owosokws knkzmo1 lkz/

mo~15354 Lol? 45;*6+>667 ~<1s|>22n{t1 {~r243143352m zm~16655; WTOj> 6637<6

93

5<1 [sk Q.Rky|s tN.[sk~|o S.Solow [.yt FG.Nwlo~/ _twwtky U.okw1[o?tzr

kzOzo~zk{zkw

Zoook~ms Froznk q{~Lok~ {qlkzmo~ Zom~~ozmo >FzVzwtzo Jow|st l{zoz

[n1 L~{z Wms{w1

5354 Lol 55?45>9=::<51 s|>22n{ t1{~r243166<= 2q|r15354 19=::<5 WTOJ>
 66:=5;4=
 5=1 Rkzr U.bK1Ontrtkw tz~oz t{zq{~qok~ {qmkzmo~ ~om~~ozmo lozoqtmk
 w{mkzmo~ |ktozD> F/
 oyk~tm ~oto kznyok/kzk w~t1 Wms{{zm{w{ r15356 F~r 45?|{z1: 4==1
 s|>22n{t1{~ r2431433 52
 |{z1:4== WTOJ> 6;9;4=4<
 631 F~v~ NV)Tkww S1[m{|tizr ~nto> {~k~n kyo~s{n{w{rtm
 kwq~kyo{~v1 OzQ[{m Zo To~s{n{w 1
 5339 Lol? <*4+>4=~65 1

5339 Lol? <*4+>4=~65 1

641 l{{vo F.[ytꝛꝛ J.G{{ꝛꝛ s F1Goꝛꝛ{zn WOIV> \so [WO]KZ \{{w q{~Yꝛꝛkwtꝛꝛkꝛꝛtꝛꝛ oKꝛꝛtnozmo

[ꝛꝛꝛsoꝛꝛtꝛꝛ 1Yꝛꝛkw

Nokwꝛꝛs Zoꝛꝛ1 5345 Vmꝛꝛ? 55*43+>476 9~761 sꝛꝛꝛ|ꝛꝛ>22n{t1{~ r243144; ;2437=;65645

795=6< WTOJ> 55<5=7<:

651 G~kꝛꝛz ^.lwk~vo ^1\soykꝛꝛtm kzkwꝛꝛꝛtꝛꝛ1 Oz>l{{|o~ N.lkytm WT. S{zr JS.Wkzꝛꝛo~

F\Ztznꝛꝛv{|q J.

[so~ RQ.ontꝛꝛ{~ꝛꝛ1 FWF skznl{ {v{q~oꝛꝛok~ms yoꝛꝛs{nꝛꝛ tz|ꝛꝛꝛms{w{rꝛ.

^{w5>Zoꝛꝛok~ms noꝛꝛtrzꝛꝛ> Yꝛꝛkzꝛꝛt/

kto. }kwtkto. zo~{|ms {w{rtmkw. kznlt{w{rtm kwdOzo~zof1
 _kstzr{ z>Fyo~tmkz Wms{w{rt mkw
 PLOS ONE_ol/lk ontzo~oz t{z q{~qok~ {qmkzmo~ ~om~~ozmo> Fm{|tzt
 ~oto
 WSV[VUK s|>22n{t1{~ r243146; 42u{~zkw1|{ zo13645; := U{oylo~ <.5357
 5625: F{mtkt{z ?5345 dmton 5355 [o| 49f1|19;~;41 Fktwklwo q~{y>
 s|>22m{zoz 1k|k1{~r2l{|v 246:53/
 337
 661 kznozGo~r [_ . Mtowtoz TLT. Iooo~ QFK. kzno~M~kkq _\F. Voookr
 o~WG.W~tz QG1

GZKF\N> _ol/G k on [owq/Tkzkr oyo{~Wms{w{rt mkwFnuyo{ Fqo~
 W~tyk~ G~ok lkzmo ~
 Zo{w {qkTwtmoz~ Zkzn{yt on l{z~{wwo n\~tkw1 Qlwzt Vz{w VqqQFy[{m
 lwtz Vz{w1 5349 [o|
 4?66*59+>5;: 6~;41 s|>22n{t1{~ r243145332Q IV15346 1971=6<: WTOJ> 5:4:=: 54
 671 l{y|oz L.Gt owtzr K.[msowwovo zT.J{zno~ Z.lk~w{z
 S.kzno~SooT.o kw1Lkmo/{/Lkm okzn
 Oz~zo/Gk onTtznq wzo /Gk on l{rztto \so~k| l{y|k~on _ts \~okyo{
 k]kw tzZonmtzr

Wms{w{rt mkwJt~o tzWktoz _t s lkzmo~> FTwtmoz o~ Zkzn{yt o
 nl{z~{wwon \~tkw1 Qlwzt
 Vzm{w VqqQFy[{m lwtz Vzm{w1 534< F r 43?6:*56+>574 6~541
 691 V{ FR.[m o z KI.[{~tkz{ KI.Sk~ozmok QW.[torow]1Kqqom
 {qk~kzn{yt o nr~k t no tz o~/
 oz t{z {znok s/~owk onqok~ {q~om ~~ozmo tzl~ok mkzmo~ ~~ t {~1
 Nokw s Wms{w VqqQJt Nokw s
 Wms{w FyWms{ wF{m1 534: Jom? 69*45+>465 3~<1 s |>22n{t1
 {~r2431436;2s ok33337 33WTOJ>
 5;9467;9

5;9467;9

6:1 Stmsozsk w_M. l{~zo~ M_. [wtukv K\Z{lo~ RK.Stb.G~otlk~ _o kw1F|tw{ ~kzn{yt onm{z/

~{wwon ~tkw{qm{rztto ltk y{ntqtmkt{z {~onmo qok~ {ql~ok mkzmo~ ~om~~ozmo1 lkzmo~1 534; F|~

49?456*<+>475 7~661 s|>22n{t1{~ r243143352 mzm~1637;< WTOJ> 5<39944=

6;1 kznokw T.\soo G.Mtowtoz T.[|omvoz F.W~tz Q1Kqgtmk {qGwoznon l{rztto Goskt{ ~

\so~k| q{~Ntrs Lok~ {qZom~~oz motzG~ok. W~{ko. kznl{w{~omkw lkzmo~ [~t{~ >\so

[_VZ] [nn. kZkzn{yt o nl{z~{wwon \~tkw1 Qlwzt Vzm{w1 534; Qw4?69*4=+>54;
 6~<61 s|>22n {t1
 {~r243145332 QIV1534:1; 319634 WTOJ> 5<7;4; 5:
 6<1 G~y Z.\soo G.Z{n o wwS.Rto _.[|omvoz F.kzno_kw T.o kw1S{zr/o~y
 oqqtmkm kzn{/
 oqqomt ozo {qlwoznnon m{rztto loskt{ ~so~k| q{~strs qok~ {q~om~~ozm
 otzl~ok. |~{k o kzn
 m{w{~omkw lkzmo~ ~t{~> q{ww{ /| {qso[_VZ] ~kzn{yt
 onm{z~{wwon ~tkw1 GTI lkzmo~1 534=

Jom? 4=*4+>7:51 s|>22n{ t1{~r243144<: 245<<9/ 34=/9:49/ 6WTOJ> 643=:67
 6=1 Zoww S.]rkwno F.V~owwkzk S.Ttwzo J.R~t szk ky T.Iskylo~ Z.okw1F|tw{
 ~kzn{y t on m{z/
 ~{wwon ~tkw{qkz{zwtzo ytnq wzo //lk on |~{r~ky q{~|o{|wo ntkrz{ on t s
 yowkz{yk1 [|{|~
 lk~o lkzmo ~VqqQT w tzk w F{m [|{| ~lk~o lkzmo~1 534= Qw?5;*;+>5;69 ~7:1
 s|>22n{t1{~ r2431
 433;233 953/34</7 9;7/: WTOJ> 6393:436
 731 kzNowy{ zn[Q.kzno~SooTS.kz_{o tv ZFT. S{nno~ W.no^~to Q1U{oqqom
 {qIGV/lk on

{zwtzo  owq/sow|  ~ktztzr  {~on mo qok~ {qmkzmo~ ~om ~ ozmo> Lt~  
 ~o  w   {q solFZK[\ y w tmoz o~
 ~kzn{yt  onm{z ~{wwon  ~tkw1 W  ms{{zm {w{r 1 5353 Qkz? 5=*4+><:~=
 ;1s  | >22n{ t1{~r24314335 2|{z1956 6
 WTOJ> 649=9: 5;
 741 Lkzr [b._kzr bS.S _N. SooR\.R { bS.Lo  o~ [Q1S{zr/  o~y oqqom t ozo 
  {qkzK/lk on   ~ t/
  {~ st| mk~o |wkz q{~l~ok   mkzmo~   ~ t {~ > F} k t/o | o~tyoz kw
    n 1 Wk toz  Kn m l{ z 1 5353
 Tk~? 436*6+>97= ~991 s  | >22n{t1{~ r2431434 :2u1|om1534 =13=1345 WTOJ>
 6499<6 56

751 T~|s TQ.Uo| QT.G{ W.S{rszkz [F.Q{lo~ FK.Rt~oz S.okw1Zkzn{y
 t~on m{z~{wwon
 ~tkw{qtz~o~zo/now t~o~on m{rzt~t~o losk~t{ ~so~k| ~q{~mwtztkw
 no|~o~t{ zkzn2{~ kz~to~ tzmkmzmo~
 ~~t~{~ ~*tlkzFJF W\Kk~w~+1 W~ms{{zm {w{r~1 5353 Qkz? 5=*4+>;~<
 91s~|>22n{t1 {~r243143352| {z1
 95.; WTOJ> 64:9=< 55
 761 _krzo~ SO.\{{~o QF.Nkww JS.So~tzo GQ.Gok~y{z~ Q.J~qqom~ Q.o~kw1\k~ro~o
 noNokw~s Oz~o~~oz~t{z

{Zonmo G~ok lkzmo~ [~t{~)Lok~ {qZom~~oz mo>Zoww L~{y
 soL{Zttno Zkzn{yt on
 \~tkw1 QUkw lkzmo~ Oz1 5354 U{ 5?446*44+>47 =9~9391 s|>22n{t1{~
 r243143=62uzm t2nukl433 WTOJ>
 6739;7:=
 771 ^t~o~ F.W~tz QG.Qkzoz S.Zknoyk [F.[msw{{ T[. kzkwoz \.okw1M~{|
 yontmkw m{zwwkt{z
 *MTI+ kznklwo/lk on{zwtzo ||{~ r~{| oot{z tzsoq{ww{|/
 {q|~ok mkzmo~> Fyw~tmoz~o~

~kzn{yt onm{z~{wwon ~tkw1 G~ok Kntzl [m{w1 534< F?r? 73>4<4`
 <1s|>22n{t1{~ r2431434 :2u1l~ok1
 534<1391 345WTOJ> 5==3;;74
 791 Wozr S.bkzr b.Isoz T.aI.Isoz b.StZ.okw1Kqqom {qkz{zwtzo ytnqwzo
 /lkon tzo~oz t{z
 {zLok~ {qlkzmo~ Zom~~oz mokzn}kwt {qwtqoky{zr Istzoo l~ok mkzmo~
 ~t{~1 l{y|woy oz
 \so~ lwtz W~km1 5355 U{? 7=>434: <:1s|>22n{t1{~ r2431434 :2u1m|m|1535514
 34:<: WTOJ> 6:67;494

7:1 Fvomst \.bkykr mst\.]mstnk T.Oykt L.T{ytz{ R.Rkvt L.okw1[yk~|s
 {zoWms{so~ k|
 Zonmo Lok~ {qlkzmo~ Zom~~ozmo Fy{zr G~ok lkzmo~ [~t{~ >FLww
 Jomoz~kwt onZkzn{y/
 ton I{z~{ww nlwtztkw \~tkw *Q/[]WWVZ\ 4;36 [n+1 Qlwzt Vzm{w1 5356 Lol
 43?74*9+>43:= ~;<1
 s|>22n{t1{~ r2431453 32QIV155133 :==WTOJ> 6:655<<5
 7;1 Notztro~ SK.[yts FG.Vwo~ O.M~tyt{ zW.Rwotz G._{{oz F.okw1o/^|> Joow{|y
 ozkzn|tw{ o/

tzr{qk ol/lk on tz o~ oz t{z {~on mo kz to kznno|~o t{ ztz ~t {~
{q o tm wk~ mkzmo~1 K~Q
lkzmo~ lk~o *Kzrw+1 534; U{ ? 5:~:~+1 s |>22n{t1 {~r243144442o mm145:=< WTOJ>
5<9773 <9
PLOS ONE_ol/lk ontz o~ oz t{z q{~qok~ {qmkzmo~ ~om ~ozmo> Fm{ |tzr
~o to
WSV[VUK s |>22n{t1{~ r243146; 42u{ ~zkw1|{ zo13645; := U{ oylo~ <.5357
5725: 7<1 [yt s FjGoz). Ztzm{zo V.Notztro~ S.M~tyt{ zW.\~kz G.{mvwo~ TZ.
o kw1Vzwtzo | ms{w{rtmkw

0owq/ykzk royoztz0o~0oz0t{z q{~0o00tm0wk~ mkzmo~ 00~0t0{~0 *o/l 513+>
 |~{yt0tztzr kmmo|0kltw t00kzn
 |~owtytzk~0 oqqtmmk0 .l00wtyt0on qok0tltw001 QW00ms{0{ mVzm{w Zo0
 W~km01 5353 Vm0? 5*6+>o661
 7=1 Sozrkms o~lF.Zotms ZZ. Zkyo 0k~[.Fwtzk0 IG.T{0m{0{ T.l{00tz S.o0kw1Lok0tltw
 00{q0soy{ltwo
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 q{~00y|0{y ty|~{0o/
 yoz0 ky{zr l~ok00 mkzmo~ 00~0t0{~0 1W00ms{{zm{w{ r01534< Lol? 5;*5+>957~
 641s00|0>22n{t1{~ r2431

43352|{z1 77=4 WTOJ> 5<::9974

931 Oykt L.T{ytz{ R.Rkvt L.N{~tv{st T.L~vk k \F.R{zn{ U.o kw1[yk~|s
 {zo|~{lwoy/ {w t z r

so~k| {~onmo qok~ {qmkzmo~ ~om~~ozmo ky{zr l~ok mkzmo~
 ~~t{~> kz{|oz t z r w o / k ~ y | t w {

n1 Q|zQlw t z V z m { w 1 534= Qz4?7=*:+>96;~ 771s|>22n{t1{~ r243143=62
 uum{2s339 WTOJ>

63;=649:

941 [yts FjGoz). Gkyrl{ uo/F{nowo F.Qorksoo [.G{ W.Rwotz G.[kw o~
 T.o kw1Lok t l t w t k z n | ~ o /

wtytzk~ oqqtmk {qtl{z}o~ Lok~> kowq/rtnon ntrtkw tz o~ oz t{zq{~qok~
 {qmkzmo~ ~om~ ~ozmo1 Qlkz/
 mo~[~t dOz o~zof1 5355 Qw59dmt on 5355 [o| 49f?Fktwklwo q~{y>
 s|>22wtzv1 |~tzro~1m{y 2431433;2
 44;;7/355 /34566/=

951 Tk~tz L._~trs N.T{{n S._stoykz G.TmMtwwt{z T.lwzo _o kw1Now|
 {V o~m{yo W~{lwoy

Kqqomt ow q{~lkzmo~ [~t{~ >Jo ow{|y ozkznKkwkkt{z {qk}trtkw
 [owq/Tk zkroyoz W~{r~ky 1Q

Ton Oz0~zo Zo1 5353 Tk 4=?55*9+>o4;< 571s|>22n{t1{~ r243154=:24 ;<57
 WTOJ> 6553=95=
 961 Wo~o MR. _kw s KF.Yktz R.Fl~ky{ zQ[.Wk~v KZ1Ft~kw ~otwtozm
 |~{r~ky q{~wy|s{y k~t/
 {~> sow|tzt ~t{~ m{|o ts |{~/~ok yoz mskwwozr o1Wms{w
 Nokws1 5354 U{? 6:*44+>46 95~
 ::1s|>22n{t1 {~r243143<323 <<;377: 1535314<7=:== WTOJ> 66594<:4
 971 W~knskz W.[sk~|o S.G{ WU.[yts FG.Zoww N1OkG~toq Vzwtzo G{{vwo
 [qqtmtoz {Zonmo

Lok~ {qlkzmo~ Zom~oz mo{~W~{r~o t{ztz_{yoz _t s V k~tkz lkzmo~D L~{z Wms{w1 5354?
 45>:6746:1 s|>22n{t1{~ r243166<=2 q|r153541: 6746: WTOJ> 66;4:=35
 991 Ttv{wkov T._t IT. Gk~s Q1Kqqom kznOy|woy ozk{t{z {qkTtznqwzo
 kznZowk{k{t{z F|| q{~
 Wktoz _t s lkzmo~> Tton Tos{n Loktlwt [n1 QTOZ lkzmo~1 5354
 Qkz46?;*4+>o4:;< 91
 s|>22n{t1{~ r243154= :24:;<9 WTOJ> 6676=4 65
 9:1 [ot J|T. Rzko o w~n I.J~kz M._kkn [.M{wnlomv S1Ozo~zo /lkon
 |ms{ so~k| tz{zr

knw ~t{~ {q|ontk~tm mkzmo~> qoktltwt kn|k~tmt|kz)
 ktqkm t{z1 llo~| ms{w{r Gosk
 [{m Uo1 5347 [o]? 4;*+=>:57~ =1s|>22n {t1{~r243143< =2mlo~1534 7133::
 WTOJ> 594::3<5
 9;1 Ur oz W.Not o Z.Yozzo tww oK.Rskz Z.Ztzkwn{
 K.okw1Fzo kytzk{ z{qno|~o/
 t{z. kzto. kznqok~ {q~om~~ozmo ky{zr mkzmo~ ~t{~ s{ |k~tmt|
 kon tzk~kw m{rztto
 loskt{ ~kwso~k| *IG\+/lkon owo|s{ zom{kmstzr |~{r~ky1 [|{|~ lk~o lkzmo~
 VqqQTwtzkw

F{m [|{~ lk~o lkzmo~1 5355 [o|? 63*=+>;656 ~651
 9<1 [mswoms [.Uo|lo~ [.Tozr R.Zklo F.Qozmsvo K1lskzro {q[|y|{y
 {qFzto. Jo|~o{t{z.
 kznLktr o tzlkzmo ~Wktoz 6T{z{s kqo~ k^tno{/Gk onOz o~ozt
 {z1OzQKzt~{z Zo Wlwtm
 Nokws1 5356 Vm4;?53*53+>:=6 61s|>22n{t1{~ r243166= 32tuo~|s535 3:=66
 WTOJ> 6;<<;;4
 9=1 Skzro S.Ltzv Q.Gwotms I.M~koqoz T.[msw N1Kqqomtozo .kmmo|kzm
 okznktoqkmt{z {qrtnon

msk r~{ | tz|ms{ {m tkwkqo~mk~o q{~{ |kto zt s |~{ko
 mkzmo~ kqo~ |~{kom{y 1Ozo~zo
 Ozo~1 534; [o|? =>9;~:71 s|>22 n{t1{~r243143 4:2u1tzoz 1534;13: 1334
 WTOJ> 63469<6<
 :31 \klo~ UTV)\{{wo T[. Qozoz FGG{{ WU.\soo G.Kwvuñ~ Ko kw1l{z}o~
 Lok~/M~{ |>F~kz/
 n{yt on m{z~{wwon ~tkw{qkz{zwtzo/now to~on r~{ |lk on|ms{w{rtmkw
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 Qw59?|{z1: 4=61 s|>22n{t1{~ r2431433 52

|{z1:4=6 WTOJ> 6;7<=;79
 :41 Struo/N t~o~ bS.Now|o~ l_. Jo_tUQ.^kz Jo~SooTS1Kqqomtozo
 {qkrtnon {zwtzo |~tyk~
 mk~o tz~o~oz t{zq{~qok~ {qmkzmo~ ~om~~ozmo> F~kzn{yt onm{z~{wwon
 ~tkw1 Wms{{zm {w{r1 5356
 Jom? 65*45+>4<6 =~7;1 s|>2 2n{t1{~r243143 352|{z1: 564WTOJ> 6;<93<;:
 :51 [yts FGoz. Gkyrl{ uo/F{nowo F.G{{ W.Rwotz G.\~zo~ Q.[sk~|o
 S.okw1Joow{|y ozkzn
 kltwt okwk{z {qkz{zwtzo owq/ykzk royoztz~o~oz t{zq{~qok~
 {qmkzmo~ ~om~~ozmo *tl{z} o~/

Lok~+1 Wms{{zm {w{r1 5353 Qkz? 5=*4+>=<~4 3:1
 :61 Gtowntzr K.ltwwooz S.[|tzs{oz W.[msowwo voz T.l{y|oz
 L.kzno~SooT.o kw1Joow{|y oz{q
 so\so~k|o tmFwwtkzmo kzntFF{mtk{t{z _t s Oz o~zo /Gkon Ttznqwzo
 /Gkon l{rztto \so~k|
 q{~jt~o~o nlkzmo~ Wktoz> [om{zn k~Fzkwtt {qkTwtmoz o~
 Zkzn{yt onl{z~{wwon \~tkw1 Q
 Ton Oz o~zo Zo1 534= Vm4<?54*43+>o47 3:91 s||>22n{t1{~ r243154= :2473:9
 WTOJ> 64:5<; =4

:71 Itwwoꝛ S.kzno^oz TV. I{y|oz LZ.Gtꝛowtzt KT. ꝛkzno~SooTS.[|omvozꝛ
 FK1W~ontmꝛ{~ꝛ kzn
 Kqqomꝛ {q}ꝛkro {qkzVzwtzo Ttznqꝛwzo ꝛꝛOzꝛo~ꝛozꝛt{z q{~Jtꝛꝛ~oꝛ ꝛonlkzmo~
 Wkꝛtozꝛꝛ>]ꝛkltwtꝛꝛ [ꝛꝛnꝛ1
 QTon Ozꝛo~zoꝛ Zoꝛ1 5353 Vmꝛ5?55*43+>o4; 95:1 sꝛꝛ|ꝛ>22n{ t1{~r243154=: 24;95:
 WTOJ> 6633:9;;
 :91 Jkꝛtoꝛ L.Nk~~tꝛ T.[skꝛ Q.Gꝛꝛꝛ{ꝛ W.UoꝛIꝛ Q.Tꝛ~|sꝛ T.oꝛkw1]|ꝛkvo {qkz{zwtzo
 |ꝛꝛms{w{rtmkw ꝛso~/
 k|ꝛ|~{r~ky *tlkzFJF W\Kk~wꝛ+ ꝛsoz ty|woyozꝛo nꝛtꝛstz kmwtztmkw |kꝛsꝛkꝛ
 tzmkszmo~ mk~o mozꝛ~oꝛ1

Wms{{zm {w{r1 5355 Lol? 64*5+>66<~ 741s|>22n{t1{~ r2431433 52|{z19<3<
 WTOJ> 6794=6<7
 PLOS ONE_ol/lk ontz~oz t{z q{~qok~ {qmkzmo~ ~om~ozmo> Fm{|tzt
 ~oto
 WSV[VUK s|>22n{t1{~ r243146; 42u{~zkw1|{ zo13645; := U{oylo~ <.5357
 5925: ::1 kzNowy{ zn[Q.S{nno~ W.kz_{otv Z.no^~to Q.kzno~SooTS1IG\lkon
 Vzwtzo [owq/sow|
 \~ktztzr {Zonmo Lok~ kznJt~o Fqo~ lkzmo~ *IFZK[\ Zkzn{yt on\~tkw+>
 57T{zs L{ww{/|

]ṭzr Sḳoẓ M~{̣̣s T{noẉ kznSḳoẓ lwḳ̣ Fzkẉ̣̣ṭ1 Fzz Gosḳ Ton1 5356
 F|~53?vkkm3;<1
 ṣ̣̣|̣̣>22n{t1{~ r243143= 62kly2vkkm 3;<WTOJ> 6;3;<=53
 ;;1 G̣̣̣{̣̣ WU.\̣̣~zo~ Q.Mtwms~ṭ̣̣ Q.[sk~|o S.[yṭ̣s FG.Lk~noww
 QK.ọ̣kw1Zkzn{yṭ̣on \~tkw {ql{z}̣̣o~ /
 Lok~> FU{̣̣ow. \so{~ọ̣ tmkwẉ̣ Gḳ̣on Ẉ̣̣ms{̣̣{mtkw Oẓ̣o~̣̣oẓ̣t {zq{~Lok~
 {qlkzmo~ Zoṃ̣~̣̣oz mo1Qlẉtz
 Vzm{w VqqQFy[{m lẉtz Vzm{w1 534; Jom 53?69*6:+>73: :~;;1 ṣ̣̣̣|̣̣̣̣>22n{t1{~ r24314533
 2QIV1534;1; 61
 459; WTOJ> 5=3=9: <4

459; WTOJ> 5=3=9: <4
 :<1 Gok S.Gtzzt{z l1F[oy ktmZo{to {qW~ontm{~ {q.kznZok{z
 q{~.Fnso~ozm o{Vzwtzo W/
 ms{w{rtmk wOzo~ozt{z 1OzQGosk Ton1 534: Jom? 56*:+>;;~ =71s|>22n{
 t1{~r2431433; 24595=/
 34:/=99:/ =WTOJ> 5:=9;43 =
 :=1 l{|o~ TW. Fwokzno ~MS.cskzr U.Stwo ZQ.Tknn U.U{kv TF. okw1Kzrkroyoz
 kznZo{ozt{z>
 Tok~tz rG~okns kznJo|s {qWk~tmt|kz]o {qkzVzwtzo Oz{o~ozt {z1QTon
 Oz{o~zo Zo1 5343

U{ 4<?45*7+>o951 s|>22n {t1{~r243154= :2uyt~147 63WTOJ> 543<;=55
 ;31 S zms LF.Rk{zk S.Qoqq{~n T.[yts FG.[sk Q.Jstww{z NT. o kw1Lok tltwt
 kznFmmo|klt wt{q
 Lok~/So >F[|on/I k~oW~{r~ky {Tkzkro Lok~ {qlkzmo~ Zom~~oz motzWo{|wo
 ts Tokk tm
 Towkz{yk1 Qlwzt Ton1 5353 [o| 47?=*=+>5=:1 s|>22n{t1 {~r243166=32u
 my=3=5=: WTOJ> 65=6;= 75
 ;41 UONZ *5353+ Oy|~{tztz {qzno~/ o~on r~{ tzmwtztkw
 ~ook~ms> Mtnkzm oq~{y soUONZ/

OUISJ] K|~{uom1 dOz o~zo f1]R> UONZ1? 5353 dmt on 5355 Vm59f1Fktwklwo
 q~{y> s|>22 1zts~1
 km1v2n{m yoz2ty|~{ tztz/tzmw tt{z/{q/zn o~/ o~ on/r ~{ |/tz/m
 wtztmkw/~o ok ~ms/rtnkzmo /q~{y/
 tzmwno/|~{ uom259769
 ;51 Lkz T._kzr b.csozr S.l tT.cs{ a.Stc1Kqqomtozo {q{zwtzo ytnq wzo
 /lk on tzo~ oz t{z
 q{~mkzmo~ |ktoz> koyk tm ~oto kznyo k/kzkw t1Q|zQlwztz
 Vzm{w1 5356 U{ 9?96
 *44+>43:<~ ;:1s|>22n {t1{~r243143= 62uum{2s kn4 34WTOJ> 6;9::9<;

;61 Stt{zr{z WT. Zoww S.V~owwkzk S._tz~o~ U.Qoqq{~n T.Mt~rt
 F.o{kw1Kqqtmm kzn{m{/oqqom t/o/
 zo {qkz{zwtzo ytnq{wzo |~{r~ky *TtznVzStz o+{~onmo qok~ {q~om~~ozm
 oky{zr |o{|wo ts
 mkzmo~> n |~{m{w q{~k~kzn{y ton m{z~{wwon ~tkw1 GTQ V|oz1 5355
 Qkz? 45*4+>o39; 5451 s|>22
 n{t1{~r243144 6:2lyu{|oz/53 54/39;545 WTOJ> 693554;=
 ;71 Stms{oz{sk w_.G~ot{lk~ _1F{oz{t{z kznOz{o~|~o{k t{zT{ntqtmk{t{z *FOT+
 q{~Lok~ {qlkzmo~ Zom~/

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~ozmo> FzOz o~ oz t {zjo ow{|y oz [ n dOz o~zo f1 lwtztkw\~t kw 1r{?
5345 dmt on 5355 [o| 53f1F ktw/

klwo q~{y> s |>22mwtztkw ~tkw 1r{ 2m 52 s{ 2UI\3494; =79

;91 Soo~ykvo ~ S.J{Ævtzr [.\so o G.G~kky o FTQ. Mtowt o zTLT. no_tw QN_.

o kw1[ n |~{ {m{w

{q solVZZK l\y w tmoz o~ ~tkw> sooqqtmkm {qlwozno nm{rzt t o losk t{

~kw so~k| q{~~on mtzr | /

ms{w{rtmk wnt ~o tzm{w{~om kw mkzmo~ ~ ~t {~ 1 GTI lkzmo~1 534<

Jom? 4<*4+>;7<1 s |>22n{t1{~ r2431

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44<:245 <<9/34</7 :79/: WTOJ> 63354999
 ;;1 J{Ævtzr [.R{wtw [[kz. \soo G.G~kkyo FTQ. Iooo~ F.W~tz QG1I{yltzon
 Lkmo/{/ Lkmo kzn
 Vzwtzo I{rztto/ Goskt{~kw \so~k| q{~Ntrs Jt~oo {ql{w{~omkw lkzmo~
 [~t{~> Flko [nn1
 I{rz Gosk W~km1 5354 Lol? 5<*4+>43;~ 561
 ;;1 [lzt]G.Lk~l UF.Wtonkw RFS. [|omk T.S|tmsv [.\kzr WF.okw1F[yk~|s
 {zoF||~Gkon
 Ttznqwzo Ozoo~ozt {zq{~lkzmo~ [~t{~>W~{m{w q{~kZkzn{yt
 onl{z~{wwon \~tkw1 QTOZ Zo

W~{ {m1 5353 Tk 44?=*9+>o494; <1s|>22n{t1{~ r243154= :2494;< WTOJ>
 656=39 =4
 ;<1 Wkw[R1F||/Gkon Ttnq wzo Oz o~ oz t {zq{~ soOy|~{ oy oz {qY kwt
 {qStqotzWk toz _t s To/
 k k tm Zozkw loww lkzmo~ dOz o~ zo flwtztkw\~t kw 1r{ ? 5354 dmt on 5355
 [o| 53f1F ktwklwo q~{y> s|>22
 1mwtztm kw ~tkw 1r{ 2m 52 s{ 2UI \37;<<3=9
 PLOS ONE_ol/lk ontz o~ oz t{z q{~qok~ {qmkzmo~ ~om ~ ozmo> F m{|tzt
 ~o to
 WSV[VUK s|>22n{t1{~ r243146; 42u{ ~zkw1|{ zo13645; := U{ oylo~ <.5357 5:25: