# Mi ochondrial DNA Anal i of Ancien Per ian Highlander

 $K - S + \frac{1}{2}N A + \frac{2}{2}S + G + \frac{3}{4}I S + \frac{4}{4}$ 

<sup>1</sup>De a e fA h g, Na a a e ca a ed b H a B gha a he a c e f Pa ca ca cha, Pa a a ca, a d H a a ea he fa ed I ca a e a e a d a e f Mach P cch a in alla jon and oad and i a chi ect al and ce amic the hip of Pa ca cancha da e back  $\rho$  he eign of he Inca king To a Inca ( on of he king Pachac j Inca Y an i), a o ima el in he la e 15 h cen (Kendall, 1985). Ba ed on a chi ect e, ce amic, and o he a ifact fo nd in a ocia jon, he b ial ha Bingham e cata ed a Pa ca cancha and Pa allac a can be a igned  $\rho$  he e iod of he Inca con ol of he U bamba Valle, fom ca. mid-15 h  $\rho$  ea l 16 h cen the (Bingham, 1913; Kendall, 1985; MacC d, 1923). Ote he a 20 ea in addition  $\rho$  he afo emen-joned o k led b Kendall, he e ha been m ch effor  $\rho$  el cida e Inca and e-Inca occ a jon along he "Sa-

 $e_{\mu}$ ed in the HVR 1 region. F the character i a jon of

inde enden 1, ing he mono le PCR me hod  $\rho$  ma i-mi e he ob ne of PCR. A 1-µl ali o of he PCR od c a e a a ed b elec o ho e i in an 8-cm na i e ol ac lamide gel (10% T, 5% C) con aining 1 × TBE b ffe (H 8.0) i h nning b ffe (0.5 × TBE, H 8.0). DNA band e e de ec ed b 1 a iole i adia ion af e aining i h e hidi m b omide (Fig. 2).

#### Da a anal i

Da a anal i Wi h im or ed kno ledge of he global m DNA ee in ecen, ea, an nde anding of he c, e of m DNA da a and a igning he m DNA e o a lace in he global m DNA ee hare been im li ed. Con ol-egion mo if e e iden i ed fo a majo i of he majo ha log o and hei bha log o (Alre -Silra e al., 2000; Bandel e al., 2001; Kiri ild e al., 2002; Kong e al., 2003; Maca la e al., 1999; Ma ama e al., 2003; Q in ana-M ci e al., 1999; Ma ama e al., 2003; Q in ana-M ci e al., 1999; Yao e al., 2002, 2003). The efo e, e a igned each m DNA o ha log o acco ding o he HVR 1, HVR 2, and coding- egion da a, ing he da a and cla i ca ion ee de c ibed abore, ch ha each am le a alloca ed o he malle t named ha log o o hich i belonged. If he ha log o had f he cha ac e i ed bha log o , an a e i k a a tached o he name of he ha log o o indica e ha he ha log o a co id no be iden i ed f he (Table 3). Since ere al egment of he ame m DNA e a anal ed inde endent m DNA o elevantha -log o , e cla i ed hem f he in o mae nal line, ba ed on he n cleoide change ob e ted in he con ol and coding egion. To el cida e biological ela ion hi he4420-1...,4493a

To el cida e biological ela ion hi he4420-1...,4493a

Ha log,         Inf.         16209-16402 (16000+)         128-267 <sup>2</sup> A*         A*-1         223 290 319 362         146 235           A*         A*-2         217 228         366 290 319 3437 362         146 235           B4*         B4*-5         217 228         366 290 319 3437 362         146 215           B4*         B4*-5         217 288         3437 362         146 215           B4*         B4*-5         217 288         319         214 46 215           B4*         B4*-6         217 286         213 257         214 234           C*         C*-1         223 298 325 327         249d         214 6249d           C*         C*-1         223 298 335 327         249d         214 6249d           C*         C*-2         223 298 35 327         249d         146 215           B4*         B4*-10         217 261         323 390         214 234           B4*	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			Magnal	A. M.	ajon in egmen. <sup>1</sup>			APLP anal	tal i <sup>3</sup>	
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ecore, and e encing a e of 61.5% and 70.8%, e-ecirel. In con, a, of even individ al fom he H a a, onl to (0.28.6%) e.e. cce fill e enced. Ha log o di tib jon fo, he o al am le a a follo : 8.6% A, 65.7% B, 22.9% C, and 2.9% D. Ha-log o fe encie of con em o a. Ame indian o la-jon and ancien no h coa tam le a e al o ho n in Table 4. F- a i tc fom ha log o fe encie among egional o la jon a e ho n in Table 5. An e acter of differen ja jon bet een each ai of o la jon evealed a j icall igni can difference e ce to the encie of he o al e ac of Mach Picch, m DNA e ence of Pa ca cancha and Pa allac a e e com a ed. Ha log o fe encie of Pa ca cancha and Pa allac a a e ho n in Table 6. Gene ic dive it e light la ge, in the Pa ca cancha.

he Pa ca cancha.

### DISCUSSION

#### Haplogro p pro le of indi id al e amined in he pre en d

We fond hat ha log o B a he motif e entamong keletal am le anal ed in he Inca-e iod e ident of he U bamba Valle, follo ed b ha log o C, A, and nall D. The motif incise feat e of he ha log o o le of individ al e amined in the e entit dent di the high fee enc of ha log o B (65.7%; 23 of 35 individ al; Table 3 and 4). Cla if ing individ al el amined in the entit of the part of the second secon al in  $\rho$  mar, al un, labor of and 4, cha in ing multiplication at in  $\rho$  mar, al line e led in ha log  $\rho$  B having at lea t 18 different line in 23 individ al . In  $\rho$  he of d, the high fie enc of ha log  $\rho$  B i not cated b he concentration of individ al on a eci c mar, and line line

Ha log o B i he common ha log o in con\_em oa Cen al Andean o la jon. When he ha log o o le of he e ancient e iden of he U, bamba Valle a com a ed i h ha of o he So h Ame ican o la jon, he forme, ho ed a clear o imit o he mode n Cen al Andean o la jon ha a e di tib ed ima il in he Pe, tian and Bolitian highland (Table 4). Thi nding i ho, i ing con ide ing he highland loca jon

nding i not i ing, con ide ing the highland loca ion

of he d a ea. on he o he hand, he ancien highlande, con ide abl diffe f om individ al of he ancien no h coa comm nit in e m of m DNA ha log o f e enc. Va io line of a chaeological evidence indica e in ima e c  $f_{\pm}$  al in e ac ion be een he ancient no h coa al o la ion and con em o aneo Ec ado ian and Co-lombian o la ion (Shimada, 1995, 1999; Shimada  $e_{\pm}$  al., 1997, 2000). Rela i el high fe encie of ha -

A, eologia e Hi  $\rho$  ia del Pe, ) and Ja ane e ho  $\rho$ g a-he, Y aka Yo hii fo, hei, a i ance in he collection of poh am le ed in he mDNA anal i. Re each b K.-I.S. fo, hi t d a o, ed b G an tin-Aid fo, Scient c Re each 13575017 fom he Mini , of Ed cation, Science, S o, t and C lt e, Ja an.

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