AbGradCon 2018

1
00:00:00,260 --> 00:00:11,590
[Music]

2
00:00:18,080 --> 00:00:16,070
my name is Jose I am a PhD student of

3
00:00:21,589 --> 00:00:18,090
Biological Sciences at the National

4
00:00:24,710 --> 00:00:21,599
Autonomous University of Mexico I am

5
00:00:26,720 --> 00:00:24,720
working at the Antonio Latinos lab we we

6
00:00:31,760 --> 00:00:26,730
call him Domino's headmaster there in

7
00:00:35,540 --> 00:00:31,770
Latin means my Lord and Master and my

8
00:00:39,259 --> 00:00:35,550
advisor is Arturo visera a well the

9
00:00:41,150 --> 00:00:39,269
three of us wanted to make a new kind of

10
00:00:44,569 --> 00:00:41,160
research in the lab because viruses were

11
00:00:47,209 --> 00:00:44,579
forgotten in the early stages of the

12
00:00:51,500 --> 00:00:47,219
history of life so that is why I started

13
00:00:54,740 --> 00:00:51,510

this with with them this is a new kind

14
00:00:56,660 --> 00:00:54,750
of richer's research that we call the

15
00:01:03,139 --> 00:00:56,670
viruses maybe ancient but not but not

16
00:01:06,610 --> 00:01:03,149
primitive so as we know that a viruses

17
00:01:09,460 --> 00:01:06,620
are a biological entities that

18
00:01:13,820 --> 00:01:09,470
infectious biological entities that need

19
00:01:16,910 --> 00:01:13,830
ribosomal system of like a cell so that

20
00:01:21,670 --> 00:01:16,920
they can be they can replicate they can

21
00:01:24,530 --> 00:01:21,680
replicate their own viral proteins so

22
00:01:28,460 --> 00:01:24,540
there is like we have an estimation like

23
00:01:32,060 --> 00:01:28,470
ten to thirty one viral particles there

24
00:01:35,840 --> 00:01:32,070
are on the earth of numbering all forms

25
00:01:39,680 --> 00:01:35,850
of life how do they do do that how they

26
00:01:41,930 --> 00:01:39,690
are why are they so sexual that's

27
00:01:44,060 --> 00:01:41,940
because they have this kind of

28
00:01:47,530 --> 00:01:44,070
characteristics as you can see they are

29
00:01:52,940 --> 00:01:47,540
a we divided well biologists divide a

30
00:01:55,850 --> 00:01:52,950
viruses like RNA and DNA they are based

31
00:01:57,440 --> 00:01:55,860
in their own the genome of viruses for

32
00:01:59,300 --> 00:01:57,450
example RNA viruses have these

33
00:02:02,690 --> 00:01:59,310
characteristics like they have a high

34
00:02:05,720 --> 00:02:02,700
mutation rate for example 10 to minus 3

35
00:02:08,389 --> 00:02:05,730
nucleotides per replication but also

36
00:02:09,080 --> 00:02:08,399
they have a small genome size like 3 5

37
00:02:13,910 --> 00:02:09,090
nucleotides

38
00:02:17,430 --> 00:02:13,920

a35 kill 35,000 kind of a spares the

39
00:02:20,520 --> 00:02:17,440
these RNA viruses have population

40
00:02:24,150 --> 00:02:20,530
bigger bigger populations but also they

41
00:02:26,730 --> 00:02:24,160
have little a lateral gene transfer they

42
00:02:31,320 --> 00:02:26,740
have a deemed application but there is

43
00:02:33,690 --> 00:02:31,330
very little RNA viruses overlaps their

44
00:02:37,710 --> 00:02:33,700
own genes because they have they want to

45
00:02:41,130 --> 00:02:37,720
well they they need they have dissonant

46
00:02:44,100 --> 00:02:41,140
city of economized a the genome for that

47
00:02:48,050 --> 00:02:44,110
is why they are very very short but they

48
00:02:50,160 --> 00:02:48,060
they often have little recombination and

49
00:02:53,970 --> 00:02:50,170
practically the single-stranded DNA

50
00:02:55,770 --> 00:02:53,980
viruses behave like RNA viruses so and

51
00:03:01,410 --> 00:02:55,780
the double-stranded DNA viruses have the

52
00:03:04,200 --> 00:03:01,420
opposite cracked right so RNA viruses so

53
00:03:05,660 --> 00:03:04,210
but where do my roses fit in the in the

54
00:03:08,970 --> 00:03:05,670
Tree of Life

55
00:03:12,330 --> 00:03:08,980
well a you know that a dynamic

56
00:03:15,960 --> 00:03:12,340
comparative genomics has allowed to

57
00:03:21,240 --> 00:03:15,970
trace the history of all organisms like

58
00:03:24,900 --> 00:03:21,250
bacteria or Korea and archaea so that we

59
00:03:27,360 --> 00:03:24,910
can infer a hypothetical entity that we

60
00:03:31,430 --> 00:03:27,370
call it the last common ancestor the res

61
00:03:37,229 --> 00:03:31,440
ancestor of this three domains of life

62
00:03:45,570 --> 00:03:37,239
and we we we do this phylogeny is based

63
00:03:49,949 --> 00:03:45,580

on a RNA genes and also RNA protein RNA

64
00:03:54,330 --> 00:03:49,959
processing proteins but what happened

65
00:03:58,080 --> 00:03:54,340
with the with viruses so they a there

66
00:04:00,930 --> 00:03:58,090
are many hypotheses that place these

67
00:04:04,440 --> 00:04:00,940
viruses in the very early stages of life

68
00:04:08,610 --> 00:04:04,450
other hypotheses a put it put them here

69
00:04:10,800 --> 00:04:08,620
here here or here so then we have many

70
00:04:14,520 --> 00:04:10,810
may what were not many hypotheses we

71
00:04:16,590 --> 00:04:14,530
have just three hypotheses and we can

72
00:04:19,310 --> 00:04:16,600
subdivide it but that's another topic

73
00:04:22,920 --> 00:04:19,320
so where do biases come from we have

74
00:04:24,540 --> 00:04:22,930
first hypothesis that we call the virus

75
00:04:28,710 --> 00:04:24,550
first hypothesis or the primordial

76
00:04:30,140 --> 00:04:28,720
hypothesis you can see that since 1917

77
00:04:35,650 --> 00:04:30,150
when they a

78
00:04:40,760 --> 00:04:35,660
the guy that a discover a bacteriophage

79
00:04:46,700 --> 00:04:40,770
it tried to guess how viruses originated

80
00:04:49,970 --> 00:04:46,710
so 100 years since 100 years we haven't

81
00:04:54,770 --> 00:04:49,980
found the how the way how they how

82
00:04:57,290 --> 00:04:54,780
viruses originate so you can see another

83
00:04:58,990 --> 00:04:57,300
a hypothesis like a virus or descendant

84
00:05:03,920 --> 00:04:59,000
of parasitic cells

85
00:05:09,160 --> 00:05:03,930
like in 1935 agreement and night in 1938

86
00:05:12,050 --> 00:05:09,170
Laidlaw say that maybe ad viruses have

87
00:05:15,290 --> 00:05:12,060
cellular ancestor that was losing some

88
00:05:17,480 --> 00:05:15,300

some genes so they become in a policy in

89
00:05:20,210 --> 00:05:17,490
the parasitic entities that we know

90
00:05:22,100 --> 00:05:20,220
today another hypothesis about viruses

91
00:05:27,110 --> 00:05:22,110
that viruses the same for an escaped

92
00:05:32,060 --> 00:05:27,120
escaped genes a brunette in 1944 said

93
00:05:36,110 --> 00:05:32,070
that maybe this viruses can a porn

94
00:05:42,140 --> 00:05:36,120
because of the genes were escaping from

95
00:05:45,230 --> 00:05:42,150
from cos genomes and today in 2006 they

96
00:05:49,640 --> 00:05:45,240
still supported this these hypotheses so

97
00:05:54,880 --> 00:05:49,650
but theory of Ages came from a bacterial

98
00:05:57,800 --> 00:05:54,890
eukaryotic viruses came from eukaryotes

99
00:06:00,410 --> 00:05:57,810
so for example in this in the case of

100
00:06:02,870 --> 00:06:00,420
the promoter hypothesis a Kooning and

101
00:06:07,190 --> 00:06:02,880
collaborators say that maybe these

102
00:06:09,770 --> 00:06:07,200
viruses I have a foreign ancient virus

103
00:06:13,250 --> 00:06:09,780
world I mean before the original of

104
00:06:14,630 --> 00:06:13,260
cells so if they put they place for

105
00:06:17,930 --> 00:06:14,640
example there are any viruses that

106
00:06:21,740 --> 00:06:17,940
because they have a small genome also

107
00:06:24,680 --> 00:06:21,750
they are formed for a big half an RNA in

108
00:06:27,860 --> 00:06:24,690
engage into their genomes they say that

109
00:06:30,940 --> 00:06:27,870
maybe they are in the in they put them

110
00:06:33,470 --> 00:06:30,950
in the RNA protein world and

111
00:06:35,750 --> 00:06:33,480
retroviruses maybe they say that these

112
00:06:38,510 --> 00:06:35,760
are entities that have a transition

113
00:06:41,000 --> 00:06:38,520

between this RNA world today a DNA RNA

114
00:06:43,850 --> 00:06:41,010
protein world and then later

115
00:06:47,270 --> 00:06:43,860
the DNA viruses or or innate different

116
00:06:49,850 --> 00:06:47,280
from this DNA RNA protein world and they

117
00:06:53,170 --> 00:06:49,860
they also say that maybe these all

118
00:06:57,050 --> 00:06:53,180
viruses are the inventors of cells so

119
00:06:59,030 --> 00:06:57,060
there is the primordial hypothesis the

120
00:07:03,970 --> 00:06:59,040
other hypothesis the reduction

121
00:07:06,680 --> 00:07:03,980
hypothesis they say that this a there is

122
00:07:09,740 --> 00:07:06,690
ancestor cells the last common ancestor

123
00:07:12,140 --> 00:07:09,750
there were a loose in this this gene and

124
00:07:14,900 --> 00:07:12,150
there is an example mega viruses were

125
00:07:17,960 --> 00:07:14,910
discovered in 2001 these are the

126
00:07:23,930 --> 00:07:17,970
monsters of of biology because they they

127
00:07:27,830 --> 00:07:23,940
can they can have like two 200 by 2500

128
00:07:31,610 --> 00:07:27,840
genes you imagine that so this this mega

129
00:07:33,860 --> 00:07:31,620
viruses also have a eight important

130
00:07:37,430 --> 00:07:33,870
genes that are very conserved and these

131
00:07:40,310 --> 00:07:37,440
genes a intervene in the DNA processing

132
00:07:44,090 --> 00:07:40,320
DNA synthesis like for example RNA

133
00:07:49,010 --> 00:07:44,100
polymerase DNA polymerase trna

134
00:07:55,580 --> 00:07:49,020
synthetases a Romano claw tied a ribbon

135
00:08:01,670 --> 00:07:55,590
occupied a driven Oh clatter reductases

136
00:08:05,450 --> 00:08:01,680
a and that is why they say okay these

137
00:08:07,910 --> 00:08:05,460
proteins are also in in cells and they

138
00:08:13,010 --> 00:08:07,920

intervene in this a DNA synthesis so

139
00:08:16,550 --> 00:08:13,020
they may be these viruses come from in

140
00:08:19,580 --> 00:08:16,560
another domain like if they call the for

141
00:08:23,030 --> 00:08:19,590
domain of life so viruses were alive

142
00:08:26,960 --> 00:08:23,040
once but so that is why they put it in

143
00:08:29,240 --> 00:08:26,970
the in the tree of life so the other

144
00:08:33,320 --> 00:08:29,250
hypothesis says as I told you that they

145
00:08:36,580 --> 00:08:33,330
this genes are escaping from their own

146
00:08:40,430 --> 00:08:36,590
host so but they came from this

147
00:08:44,390 --> 00:08:40,440
hypothesis said they come a later after

148
00:08:46,820 --> 00:08:44,400
the original of cells so that is why we

149
00:08:50,270 --> 00:08:46,830
in the in the laboratory tried to obtain

150
00:08:52,520 --> 00:08:50,280
to get all the information all the early

151
00:08:55,410 --> 00:08:52,530
biological information for all databases

152
00:08:58,169 --> 00:08:55,420
of viruses like for example Jim Bank

153
00:09:01,169 --> 00:08:58,179
vayas on the international committee on

154
00:09:02,929 --> 00:09:01,179
taxonomy we get all if not not only

155
00:09:05,639 --> 00:09:02,939
biological information but also

156
00:09:08,970 --> 00:09:05,649
structural information a sequential

157
00:09:11,069 --> 00:09:08,980
information ecological information all

158
00:09:13,619 --> 00:09:11,079
of all of that week we got all that all

159
00:09:16,410 --> 00:09:13,629
those databases I want to say that in

160
00:09:18,419 --> 00:09:16,420
the lab we use bioinformatics tools so

161
00:09:20,819 --> 00:09:18,429
you go to the our love is just a

162
00:09:25,439 --> 00:09:20,829
computer lab no we don't do experiment

163
00:09:28,499 --> 00:09:25,449

experiment and in the very first stage

164
00:09:31,049 --> 00:09:28,509
of my of my project we we used all these

165
00:09:35,729 --> 00:09:31,059
biological information and you can see

166
00:09:38,819 --> 00:09:35,739
in this graph they decide the circle

167
00:09:41,939 --> 00:09:38,829
represent they a the size of viral

168
00:09:43,979 --> 00:09:41,949
genomes but also a DNA viruses are in

169
00:09:49,470 --> 00:09:43,989
blue and our universe in are in red and

170
00:10:02,570 --> 00:09:49,480
you can you can see a conic of the

171
00:10:10,940 --> 00:10:07,230
thank you okay we got we can see a four

172
00:10:15,060 --> 00:10:10,950
circles you can see the biggest a genome

173
00:10:17,430 --> 00:10:15,070
DNA genome and they're the shortest you

174
00:10:20,100 --> 00:10:17,440
know and also in RNA viruses the biggest

175
00:10:23,430 --> 00:10:20,110
and the shortest so well you can see

176
00:10:25,800 --> 00:10:23,440
that the biggest one are all it's very

177
00:10:29,670 --> 00:10:25,810
evident now that DNA viruses have the

178
00:10:31,650 --> 00:10:29,680
biggest genomes in all viruses but for

179
00:10:33,510 --> 00:10:31,660
example Proteus you can see that here

180
00:10:36,030 --> 00:10:33,520
the mega viruses megabyte has have a

181
00:10:39,960 --> 00:10:36,040
double-stranded DNA a double-stranded

182
00:10:44,550 --> 00:10:39,970
DNA genome so you can you can see a that

183
00:10:47,820 --> 00:10:44,560
a all RNA viruses are very well

184
00:10:50,190 --> 00:10:47,830
distributed in the Eukarya lineages but

185
00:10:52,800 --> 00:10:50,200
you cannot see you can see if here just

186
00:10:56,280 --> 00:10:52,810
a few of them and archaea there is a one

187
00:11:00,600 --> 00:10:56,290
of the of the oldest lineage of the Tree

188
00:11:02,940 --> 00:11:00,610

of Life they they don't have RNA viruses

189
00:11:08,610 --> 00:11:02,950
of today but it can be a

190
00:11:12,990 --> 00:11:08,620
abayas but also we can see that the RNA

191
00:11:15,360 --> 00:11:13,000
viruses infect phylogenetically distance

192
00:11:17,520 --> 00:11:15,370
a host for example RNA viruses can

193
00:11:19,410 --> 00:11:17,530
infect at the same time plants and

194
00:11:21,960 --> 00:11:19,420
invertebrates or invertebrates and

195
00:11:28,230 --> 00:11:21,970
vertebrates this you cannot see this in

196
00:11:31,170 --> 00:11:28,240
in the DNA virus in the DNA viruses so

197
00:11:33,270 --> 00:11:31,180
the hypothesis of an early or you know

198
00:11:35,640 --> 00:11:33,280
ferny viruses is not supported by the

199
00:11:39,360 --> 00:11:35,650
phylogenetic distribution as I told you

200
00:11:41,640 --> 00:11:39,370
for example this we have this the domain

201
00:11:43,800 --> 00:11:41,650
of life but you can see that the the red

202
00:11:48,390 --> 00:11:43,810
ones that is the RNA viruses in fact

203
00:11:51,300 --> 00:11:48,400
only the eukaryote a miniature but when

204
00:11:53,940 --> 00:11:51,310
I when we sought the phylogeny of

205
00:11:56,730 --> 00:11:53,950
bacteria we could we come we could find

206
00:12:00,210 --> 00:11:56,740
that a just to wire families like sister

207
00:12:02,820 --> 00:12:00,220
will die and lav VD right there's RNA

208
00:12:05,550 --> 00:12:02,830
RNA the only RNA viruses that infect

209
00:12:07,530 --> 00:12:05,560
prokaryotes and when we saw the

210
00:12:08,090 --> 00:12:07,540
phylogeny of bacteria week we could see

211
00:12:10,440 --> 00:12:08,100
that they were

212
00:12:13,830 --> 00:12:10,450
proteobacteria and Proteobacteria like

213
00:12:15,240 --> 00:12:13,840

shakeela Salmonella Erica collie is very

214
00:12:18,240 --> 00:12:15,250
ecologically related

215
00:12:20,940 --> 00:12:18,250
to the to the eukaryotes so maybe these

216
00:12:23,760 --> 00:12:20,950
these two only viral feminists of

217
00:12:26,760 --> 00:12:23,770
prokaryotes are coming from the

218
00:12:32,430 --> 00:12:26,770
eukaryotic viruses and we have evidence

219
00:12:35,130 --> 00:12:32,440
in their sequences so a as I and we have

220
00:12:39,060 --> 00:12:35,140
we haven't found a virus RNA virus in

221
00:12:41,430 --> 00:12:39,070
area so you can see that RNA viruses are

222
00:12:45,690 --> 00:12:41,440
very related to the origin or today to

223
00:12:48,840 --> 00:12:45,700
the divergence of the el correo chick

224
00:12:51,270 --> 00:12:48,850
host so maybe they had a recent origin

225
00:12:54,810 --> 00:12:51,280
and not you cannot put it in there in an

226
00:12:58,460 --> 00:12:54,820
RNA world in the other hand a mega

227
00:13:02,580 --> 00:12:58,470
viruses that has double stranded a DNA

228
00:13:04,700 --> 00:13:02,590
genome remember that they they they in

229
00:13:07,620 --> 00:13:04,710
the hypothesis of the reduction of

230
00:13:10,860 --> 00:13:07,630
genome they from the four domain of life

231
00:13:14,310 --> 00:13:10,870
but we can see that they say mega

232
00:13:18,829 --> 00:13:14,320
viruses that infect in invertebrates and

233
00:13:23,850 --> 00:13:18,839
vertebrates or protists like like amoeba

234
00:13:27,720 --> 00:13:23,860
for example we we made 2000 phylogenies

235
00:13:29,880 --> 00:13:27,730
of many many of all day the sequences

236
00:13:32,490 --> 00:13:29,890
that they they have all of the all of

237
00:13:35,250 --> 00:13:32,500
the protein that they have and I am

238
00:13:38,100 --> 00:13:35,260

showing just one the Raymond chloride

239
00:13:40,530 --> 00:13:38,110
reductase because this it had this rebel

240
00:13:43,170 --> 00:13:40,540
Crotty reductase is in the core protein

241
00:13:46,620 --> 00:13:43,180
and is the most conserved protein in all

242
00:13:49,380 --> 00:13:46,630
mega viruses and you can see in this

243
00:13:53,970 --> 00:13:49,390
phylogeny in blue we have eukaryotes

244
00:13:58,920 --> 00:13:53,980
sequences in red the virus ones and in

245
00:14:03,090 --> 00:13:58,930
purple we have we got the bacteria once

246
00:14:04,980 --> 00:14:03,100
and in green the archaea ones so you can

247
00:14:07,440 --> 00:14:04,990
see clearly that for example in this

248
00:14:10,110 --> 00:14:07,450
clade in this group we we got this mega

249
00:14:13,079 --> 00:14:10,120
virus sequences of of romano platted

250
00:14:17,840 --> 00:14:13,089
reductase and it is close to their own

251
00:14:20,810 --> 00:14:17,850
hosts so when we look when we look to a

252
00:14:22,590 --> 00:14:20,820
viral rival at the rate of days of other

253
00:14:25,170 --> 00:14:22,600
double-stranded DNA viruses like

254
00:14:28,380 --> 00:14:25,180
baculovirus Ida which in fact where

255
00:14:31,980 --> 00:14:28,390
turrets they also are close to the two

256
00:14:33,840 --> 00:14:31,990
their hosts another example of

257
00:14:37,200 --> 00:14:33,850
double-stranded DNA viruses like pages

258
00:14:40,020 --> 00:14:37,210
they there remain plot I read of taste

259
00:14:44,010 --> 00:14:40,030
is also close to their there the

260
00:14:48,330 --> 00:14:44,020
bacteria ones and so maybe this these

261
00:14:53,190 --> 00:14:48,340
repetitive reductase is a it's escaping

262
00:14:55,470 --> 00:14:53,200
from this a periodic hosts so and and

263
00:14:59,430 --> 00:14:55,480

prokaryotic house in the case of of

264
00:15:02,010 --> 00:14:59,440
phages so but not we we don't only found

265
00:15:06,440 --> 00:15:02,020
that we identified that this ravenclaw

266
00:15:08,850 --> 00:15:06,450
hi reductase is at either type 1a this a

267
00:15:13,250 --> 00:15:08,860
remember that rebel coder reductase

268
00:15:16,680 --> 00:15:13,260
intervenes in the a in the reduction of

269
00:15:19,110 --> 00:15:16,690
Ravana critize to form a succeed revenue

270
00:15:21,900 --> 00:15:19,120
plot eyes I mean the DNA synthesis but

271
00:15:25,590 --> 00:15:21,910
this this rival totally the place type

272
00:15:30,150 --> 00:15:25,600
one I do that but in the presence of

273
00:15:32,880 --> 00:15:30,160
oxygen so a there are three three types

274
00:15:36,300 --> 00:15:32,890
of rebel plotted reductase the the first

275
00:15:39,660 --> 00:15:36,310
one is needs this oxygen and the other

276
00:15:41,930 --> 00:15:39,670
one a they are anaerobic and science so

277
00:15:45,210 --> 00:15:41,940
but the ones that they want that they

278
00:15:49,740 --> 00:15:45,220
remember ty reductase that has that have

279
00:15:52,350 --> 00:15:49,750
that is in the mega virus a genome it's

280
00:15:54,060 --> 00:15:52,360
it needs this oxygen so it means that

281
00:15:57,450 --> 00:15:54,070
maybe this Raymond Cattell reductase

282
00:16:01,800 --> 00:15:57,460
they were acquired multiple times but

283
00:16:07,260 --> 00:16:01,810
before or during the great oxygenic

284
00:16:12,320 --> 00:16:07,270
event so that is it happened 2.5 billion

285
00:16:16,290 --> 00:16:12,330
years ago I mean a 1 billion years after

286
00:16:18,870 --> 00:16:16,300
they approximately the origin of last

287
00:16:21,690 --> 00:16:18,880
common ancestor so these mega viruses

288
00:16:23,490 --> 00:16:21,700

could not be in in the in the in that

289
00:16:28,770 --> 00:16:23,500
early stage of life I mean there in the

290
00:16:31,050 --> 00:16:28,780
original less common ancestor so so they

291
00:16:33,270 --> 00:16:31,060
are a we we have to conclusion about

292
00:16:35,790 --> 00:16:33,280
they RNA virus and DNA viruses there are

293
00:16:39,360 --> 00:16:35,800
no known are any viruses in archaea of

294
00:16:41,780 --> 00:16:39,370
today are any viruses or bacteria found

295
00:16:44,250 --> 00:16:41,790
in animal microbiota like

296
00:16:47,280 --> 00:16:44,260
Proteobacteria mean she careless of the

297
00:16:50,100 --> 00:16:47,290
monastic Akali so RNA viruses have a

298
00:16:52,620 --> 00:16:50,110
recent origin related to the origin of a

299
00:16:55,290 --> 00:16:52,630
eukaryotes so this means that simplicity

300
00:16:58,889 --> 00:16:55,300
I mean RNA viruses because they have a

301
00:17:01,800 --> 00:16:58,899
small a genome does not necessarily

302
00:17:03,900 --> 00:17:01,810
imply impre-- primitiveness so this

303
00:17:08,130 --> 00:17:03,910
means that RNA viruses did not originate

304
00:17:12,120 --> 00:17:08,140
at the RNA world stage but also in the

305
00:17:15,600 --> 00:17:12,130
case of of these examples of DNA viruses

306
00:17:19,559 --> 00:17:15,610
a based on the Raymond plot I'd rather

307
00:17:22,470 --> 00:17:19,569
face a type 1a of phages means that

308
00:17:25,620 --> 00:17:22,480
maybe this protein has a bacterial

309
00:17:28,230 --> 00:17:25,630
origin but in the case of mega viruses

310
00:17:30,990 --> 00:17:28,240
Bakula viruses and herpes viruses I mean

311
00:17:35,070 --> 00:17:31,000
viruses that infect this eukaryotic a

312
00:17:38,910 --> 00:17:35,080
host they this protein has maybe an L

313
00:17:41,430 --> 00:17:38,920

Kotik origin so this a relative

314
00:17:44,340 --> 00:17:41,440
reductase must have evolved once a free

315
00:17:46,500 --> 00:17:44,350
oxygen had accumulated in this event 1

316
00:17:47,220 --> 00:17:46,510
billion years after the last common

317
00:17:49,260 --> 00:17:47,230
ancestor

318
00:17:51,590 --> 00:17:49,270
therefore mega viruses have a recent

319
00:17:54,690 --> 00:17:51,600
origin close to the eukaryotic a

320
00:17:57,120 --> 00:17:54,700
divergence so they do they cannot form

321
00:17:59,460 --> 00:17:57,130
this for form domain of life so that is

322
00:18:01,530 --> 00:17:59,470
the great conclusions that we have in

323
00:18:05,160 --> 00:18:01,540
this preliminary Rizzoli's that viruses

324
00:18:07,110 --> 00:18:05,170
may be ancient but not primitive a so

325
00:18:08,280 --> 00:18:07,120
thank you very much to all of you and

326
00:18:13,860 --> 00:18:08,290
sorry for

327
00:18:17,620 --> 00:18:15,610
and have question

328
00:18:22,770 --> 00:18:17,630
thank you very much Jose we have time

329
00:18:26,080 --> 00:18:22,780
for one question so what do you think

330
00:18:28,000 --> 00:18:26,090
what's your hypothesis for the RNA

331
00:18:30,490 --> 00:18:28,010
viruses being sort of associated with

332
00:18:31,600 --> 00:18:30,500
the advent you carry carry out the

333
00:18:32,250 --> 00:18:31,610
corgin isms do you think it has

334
00:18:34,630 --> 00:18:32,260
something to do with

335
00:18:36,690 --> 00:18:34,640
post-transcriptional modification of the

336
00:18:39,100 --> 00:18:36,700
messenger RNA to make it more stable

337
00:18:42,910 --> 00:18:39,110
which allowed it to maybe then go into

338
00:18:47,410 --> 00:18:42,920

the environment and inform viruses yeah

339
00:18:51,000 --> 00:18:47,420
well actually we we know the mekinese an

340
00:18:54,610 --> 00:18:51,010
example of mechanisms of how have this a

341
00:18:58,390 --> 00:18:54,620
RNA viral genes escape from holes for

342
00:19:01,570 --> 00:18:58,400
example the messenger RNA now you do you

343
00:19:04,180 --> 00:19:01,580
need to the messenger RNA needs to go

344
00:19:07,570 --> 00:19:04,190
out from the new clothes and because

345
00:19:10,810 --> 00:19:07,580
many of RNA viruses infect a the nucleo

346
00:19:13,330 --> 00:19:10,820
career tech nucleus so maybe this could

347
00:19:15,490 --> 00:19:13,340
be an explanation of how they can can

348
00:19:19,360 --> 00:19:15,500
escape from this this cost but also we

349
00:19:22,690 --> 00:19:19,370
have to we try to in the approach in the

350
00:19:24,700 --> 00:19:22,700
next studies we need to analyze the

351
00:19:28,420 --> 00:19:24,710
movie alone for example that a

352
00:19:33,490 --> 00:19:28,430
eukaryotic host have many many retro

353
00:19:37,330 --> 00:19:33,500
elements a trans DNA transposons and

354
00:19:41,730 --> 00:19:37,340
maybe they put it aside this mobile on

355
00:19:48,750 --> 00:19:41,740
can be a transition between this a

356
00:19:52,150 --> 00:19:50,970
let's thank Jose again

357
00:19:53,450 --> 00:19:52,160
[Applause]