AbGradCon 2018

1
00:00:00,260 --> 00:00:12,150
[Music]

2
00:00:17,529 --> 00:00:15,520
so hi everyone I would like to thank the

3
00:00:20,020 --> 00:00:17,539
organizers for giving me the opportunity

4
00:00:21,520 --> 00:00:20,030
to present you today so my name is Moran

5
00:00:25,839 --> 00:00:21,530
Frankel painter I'm a NASA postdoctoral

6
00:00:28,599 --> 00:00:25,849
fellow working with dr. HUD dr. Williams

7
00:00:30,429 --> 00:00:28,609
and dr. Grover's here at Georgia Tech

8
00:00:32,409 --> 00:00:30,439
and in the Center for chemical evolution

9
00:00:35,320 --> 00:00:32,419
and today I will tell you about a

10
00:00:37,090 --> 00:00:35,330
reversible polymerization of periodic

11
00:00:39,970 --> 00:00:37,100
deficit cap that they will define what

12
00:00:43,990 --> 00:00:39,980
these are which allows selection of

13
00:00:46,750 --> 00:00:44,000

stable structures so as we know and as

14
00:00:49,049 --> 00:00:46,760
mentioned we know from prebiotic model

15
00:00:52,869 --> 00:00:49,059
actions and from meteorite composition

16
00:00:55,510 --> 00:00:52,879
that actually else today's the building

17
00:00:57,069 --> 00:00:55,520
blocks of today's biopolymers can be

18
00:00:58,840 --> 00:00:57,079
formed from these model periodic

19
00:01:01,090 --> 00:00:58,850
reactions and we can find these in

20
00:01:04,840 --> 00:01:01,100
meteorites but something really

21
00:01:07,390 --> 00:01:04,850
important is that we in the central

22
00:01:10,960 --> 00:01:07,400
chemical revolution we explore other

23
00:01:14,109 --> 00:01:10,970
product backbones for these by commerce

24
00:01:15,580 --> 00:01:14,119
with you today and we know that in

25
00:01:18,130 --> 00:01:15,590
addition to these building blocks that

26
00:01:21,429 --> 00:01:18,140
we see in today's biology we actually

27
00:01:23,890 --> 00:01:21,439
had very similar building blocks that

28
00:01:27,010 --> 00:01:23,900
could have been you know incorporated

29
00:01:30,310 --> 00:01:27,020
into proto backbones of these polymers

30
00:01:33,760 --> 00:01:30,320
in the pre run earth so they need are

31
00:01:35,139 --> 00:01:33,770
talked about what were possible a proto

32
00:01:37,840 --> 00:01:35,149
on nucleobases

33
00:01:40,660 --> 00:01:37,850
and water we'll be talking about today

34
00:01:43,539 --> 00:01:40,670
will be focus on today is what we think

35
00:01:45,670 --> 00:01:43,549
were the proto factoid backbones

36
00:01:48,359 --> 00:01:45,680
on a prebiotic earth and today we know

37
00:01:52,780 --> 00:01:48,369
there's these urges change of immunity

38
00:01:54,760 --> 00:01:52,790

but we think that we had some

39
00:01:58,030 --> 00:01:54,770
incorporation of other building blocks

40
00:01:59,859 --> 00:01:58,040
into them so just in general like to

41
00:02:02,130 --> 00:01:59,869
mention in the center of a chemical

42
00:02:06,060 --> 00:02:02,140
volition what is our approach for

43
00:02:09,460 --> 00:02:06,070
polymerization of these polymers and

44
00:02:11,740 --> 00:02:09,470
back you mentioned and david i weight

45
00:02:13,900 --> 00:02:11,750
cycles so just a brief overview

46
00:02:15,820 --> 00:02:13,910
Becky you said you like the Sun we also

47
00:02:18,070 --> 00:02:15,830
like the sun's though as a driving force

48
00:02:19,000 --> 00:02:18,080
for polymerization we know that all of

49
00:02:21,550 --> 00:02:19,010
today's bye

50
00:02:23,649 --> 00:02:21,560
are a result of condensation reaction so

51
00:02:25,780 --> 00:02:23,659
we lose water and that's exactly what we

52
00:02:29,559 --> 00:02:25,790
would want to mimic by these dry weight

53
00:02:32,140 --> 00:02:29,569
cycles so we can think about these let's

54
00:02:34,509 --> 00:02:32,150
say seasons on the previous curve we had

55
00:02:38,759 --> 00:02:34,519
some solutions with some monomers that

56
00:02:41,759 --> 00:02:38,769
first got we we had a dry hot face

57
00:02:44,289 --> 00:02:41,769
whatever vibrated that caused the

58
00:02:46,240 --> 00:02:44,299
condensation or polymerization of these

59
00:02:49,080 --> 00:02:46,250
monomers and then you can think about

60
00:02:51,309 --> 00:02:49,090
earth you got cold and we had some water

61
00:02:55,119 --> 00:02:51,319
coming and then we can have some

62
00:02:57,940 --> 00:02:55,129
structures and also some hydrolysis or

63
00:03:01,030 --> 00:02:57,950

degradation of non-structured polymers

64
00:03:02,710 --> 00:03:01,040
that will our some recycling and we can

65
00:03:05,830 --> 00:03:02,720
think about the cycle going on and on

66
00:03:11,229 --> 00:03:05,840
wet/dry cycles to drive selection of

67
00:03:13,150 --> 00:03:11,239
some stable moments the outline of the

68
00:03:15,910 --> 00:03:13,160
talk today is so I'm gonna start with

69
00:03:18,460 --> 00:03:15,920
some challenges with contemporary

70
00:03:20,949 --> 00:03:18,470
proteins or peptides in terms of or in

71
00:03:22,839 --> 00:03:20,959
life chemical abortion I will talk about

72
00:03:26,080 --> 00:03:22,849
what our deficit bath I doesn't know

73
00:03:27,940 --> 00:03:26,090
Trinity of bath day bathroom and I will

74
00:03:31,509 --> 00:03:27,950
also show you some selection of stable

75
00:03:34,210 --> 00:03:31,519
structures in a complex mixture so let's

76
00:03:36,940 --> 00:03:34,220
start when we think about the pros of

77
00:03:39,909 --> 00:03:36,950
peptides we know that fact that today I

78
00:03:41,620 --> 00:03:39,919
just I'm changed of amino acids but we

79
00:03:44,860 --> 00:03:41,630
also know it's pretty hard to form the

80
00:03:48,339 --> 00:03:44,870
amide bond between between the amino

81
00:03:51,580 --> 00:03:48,349
acids this is another thermodynamically

82
00:03:53,920 --> 00:03:51,590
favored reaction and we know it came

83
00:03:56,500 --> 00:03:53,930
before and if you use really high energy

84
00:03:58,150 --> 00:03:56,510
molecules or it will apply some really

85
00:04:00,190 --> 00:03:58,160
high temperature high pressure we can

86
00:04:02,860 --> 00:04:00,200
form that but then we'll run into

87
00:04:04,449 --> 00:04:02,870
another problem which is once we have

88
00:04:07,000 --> 00:04:04,459

this type oxide it can go another

89
00:04:09,280 --> 00:04:07,010
condensation into a psychic by heat up

90
00:04:13,180 --> 00:04:09,290
to Terry's name which is really stable

91
00:04:14,860 --> 00:04:13,190
and in a way it's gonna many times we'll

92
00:04:16,680 --> 00:04:14,870
call it a sink we're gonna stop

93
00:04:20,529 --> 00:04:16,690
polymerization into further

94
00:04:24,550 --> 00:04:20,539
elongate a change another problem is

95
00:04:26,770 --> 00:04:24,560
that reversibility so if we want to

96
00:04:28,540 --> 00:04:26,780
drive selection in our system we think

97
00:04:30,730 --> 00:04:28,550
that so we can think about the periodic

98
00:04:32,540 --> 00:04:30,740
step is really messy of having these

99
00:04:38,120 --> 00:04:32,550
really

100
00:04:41,960 --> 00:04:38,130
structure Spacely one sample and if we

101
00:04:44,210 --> 00:04:41,970
made this peptide and we cannot break

102
00:04:45,950 --> 00:04:44,220
them so the amide bond in addition to

103
00:04:48,350 --> 00:04:45,960
being hard to make it's also hard to

104
00:04:49,730 --> 00:04:48,360
break so we can follow these pathways

105
00:04:51,860 --> 00:04:49,740
but then they we're kind of stuck with

106
00:04:54,650 --> 00:04:51,870
what we've had so how can we have so

107
00:04:56,660 --> 00:04:54,660
action if we think about really trying

108
00:04:58,970 --> 00:04:56,670
out different sequences and give us some

109
00:05:02,030 --> 00:04:58,980
stable structures so we're gonna be able

110
00:05:04,300 --> 00:05:02,040
to be stuck we're gonna be able to not

111
00:05:06,920 --> 00:05:04,310
move forward and we'll just be

112
00:05:08,990 --> 00:05:06,930
maintaining with this certain sequence

113
00:05:13,610 --> 00:05:09,000

that we had so we will not have a

114
00:05:15,920 --> 00:05:13,620
disability so when with the search for a

115
00:05:17,780 --> 00:05:15,930
total polypeptide backbone I mentioned

116
00:05:21,260 --> 00:05:17,790
that in addition to the building blocks

117
00:05:25,040 --> 00:05:21,270
of today's talk ties the amino acids we

118
00:05:27,470 --> 00:05:25,050
had other very similar molecules in this

119
00:05:30,230 --> 00:05:27,480
case I'm gonna talk about hydroxy acids

120
00:05:34,550 --> 00:05:30,240
so in these molecules instead of the

121
00:05:36,260 --> 00:05:34,560
amine we have the alcohol away and we

122
00:05:40,190 --> 00:05:36,270
know that they result from the same

123
00:05:43,610 --> 00:05:40,200
synthesis so we had hydroxy acid in a

124
00:05:47,810 --> 00:05:43,620
really similar abundance to amino acids

125
00:05:51,470 --> 00:05:47,820
and so I will throughout the lecture I

126
00:05:54,530 --> 00:05:51,480
will just out of simplicity amino acids

127
00:05:56,920 --> 00:05:54,540
will be labeled as these blue circles

128
00:06:02,330 --> 00:05:56,930
and I mean the Drakh cepheid's will be

129
00:06:05,420 --> 00:06:02,340
represented as these red circles as I

130
00:06:08,120 --> 00:06:05,430
mentioned amino acids it's really hard

131
00:06:12,200 --> 00:06:08,130
to polymerize I mean axis into these am

132
00:06:14,210 --> 00:06:12,210
i fun but what we do know is that if you

133
00:06:17,030 --> 00:06:14,220
take hydroxy acid and you just dry them

134
00:06:19,280 --> 00:06:17,040
so you drive water off it's very easy to

135
00:06:23,690 --> 00:06:19,290
form the polymer hydroxy acid which is

136
00:06:27,130 --> 00:06:23,700
called a polyester through an ester bond

137
00:06:31,640 --> 00:06:27,140
right here so that's really easy so what

138
00:06:33,800 --> 00:06:31,650

dr. Krishnamoorthy suggested in the in

139
00:06:35,990 --> 00:06:33,810
the as part of the research in the

140
00:06:38,660 --> 00:06:36,000
Center for chemicals relation is what

141
00:06:42,170 --> 00:06:38,670
will happen if you take these both amino

142
00:06:44,600 --> 00:06:42,180
anti-drug see assets together so what

143
00:06:46,129 --> 00:06:44,610
happens is will actually get copolymers

144
00:06:48,379 --> 00:06:46,139
of both

145
00:06:53,059 --> 00:06:48,389
you know and I'd rocks the acid they are

146
00:06:55,670 --> 00:06:53,069
called ducks if a tide and briefly I

147
00:06:59,119 --> 00:06:55,680
will not go over the mechanism but I'll

148
00:07:01,610 --> 00:06:59,129
just say that once we form the Astra

149
00:07:03,769 --> 00:07:01,620
bond between I track the acid then the

150
00:07:07,219 --> 00:07:03,779
amino acid or the amine can attack and

151
00:07:10,429 --> 00:07:07,229
replace and we get a replacement of the

152
00:07:15,619 --> 00:07:10,439
ester with an amide bond so we're making

153
00:07:19,100 --> 00:07:15,629
that Zapata in support of potential

154
00:07:21,890 --> 00:07:19,110
world for adaptive baptized in origins

155
00:07:24,200 --> 00:07:21,900
of life we know that even today we have

156
00:07:26,390 --> 00:07:24,210
duck soup that is in nature they mostly

157
00:07:28,070 --> 00:07:26,400
serve as antibiotics but they also have

158
00:07:30,619 --> 00:07:28,080
different functions this one for

159
00:07:33,379 --> 00:07:30,629
instance is called Melina my same it's a

160
00:07:35,420 --> 00:07:33,389
cyclic to their capacity backside and it

161
00:07:37,760 --> 00:07:35,430
is it functions as a potassium

162
00:07:40,219 --> 00:07:37,770
transporter that facilitates the

163
00:07:44,809 --> 00:07:40,229

movement of potassium ions the lipid

164
00:07:47,029 --> 00:07:44,819
membrane so as I mentioned that see

165
00:07:49,909 --> 00:07:47,039
peptides they are readily formed under

166
00:07:51,469 --> 00:07:49,919
model prebiotic Gretchen so we just we

167
00:07:55,189 --> 00:07:51,479
can just dry it together I mean on a

168
00:07:57,559 --> 00:07:55,199
drug the acid and we can get them but

169
00:08:00,379 --> 00:07:57,569
the problem is that it's not so simple

170
00:08:03,409 --> 00:08:00,389
so if you just take these monomers we

171
00:08:07,040 --> 00:08:03,419
actually get a very complex mixture of

172
00:08:09,200 --> 00:08:07,050
deficit off site and my researchable

173
00:08:10,939 --> 00:08:09,210
focuses on understanding better

174
00:08:12,920 --> 00:08:10,949
understanding of these gaps across sites

175
00:08:15,320 --> 00:08:12,930
and if you have this complex mixture

176
00:08:18,230 --> 00:08:15,330
then how can really study the properties

177
00:08:21,679 --> 00:08:18,240
of that see baptize in terms of

178
00:08:25,389 --> 00:08:21,689
polymerization assembly this assembly so

179
00:08:28,579 --> 00:08:25,399
a way to make it more simple is really

180
00:08:30,529 --> 00:08:28,589
knowing the different stability of the

181
00:08:32,839 --> 00:08:30,539
ester versus their Maybach sophie really

182
00:08:35,600 --> 00:08:32,849
rely on chemistry and we know that

183
00:08:37,790 --> 00:08:35,610
actually the after bond so left to de to

184
00:08:39,589 --> 00:08:37,800
the red circles the ester bonds are

185
00:08:41,870 --> 00:08:39,599
really more susceptible to being

186
00:08:44,420 --> 00:08:41,880
hydrolyzed in the west face so when we

187
00:08:46,639 --> 00:08:44,430
have water so it will we're gonna break

188
00:08:47,210 --> 00:08:46,649

all these bonds and maintain the amide

189
00:08:49,639 --> 00:08:47,220
bonds

190
00:08:51,350 --> 00:08:49,649
we're gonna be left with fat guys like

191
00:08:54,680 --> 00:08:51,360
this and we know that this is what

192
00:08:57,949 --> 00:08:54,690
happens what happens in the system so to

193
00:08:59,930 --> 00:08:57,959
simplify the system what I did in my

194
00:09:03,860 --> 00:08:59,940
research is synthesizing these

195
00:09:07,250 --> 00:09:03,870
baptize which have just one hydroxy acid

196
00:09:10,430 --> 00:09:07,260
12i and me nothing and I'll show you one

197
00:09:13,700 --> 00:09:10,440
example so this is glycolic acid alanine

198
00:09:16,190 --> 00:09:13,710
so glycolic acid it's a red blue

199
00:09:18,020 --> 00:09:16,200
molecule so we have the Ajax es in

200
00:09:20,660 --> 00:09:18,030
analog of the lysine that's like our

201
00:09:23,210 --> 00:09:20,670
Kassadin alanine and then if we take

202
00:09:25,670 --> 00:09:23,220
this molecule and we just dry so we

203
00:09:28,250 --> 00:09:25,680
drive water off we try and hit it our

204
00:09:33,070 --> 00:09:28,260
expectation is that it will form an

205
00:09:35,660 --> 00:09:33,080
ester bond between the two units and

206
00:09:38,930 --> 00:09:35,670
that's exactly what happens so here you

207
00:09:41,780 --> 00:09:38,940
can see an HPLC analysis separation on a

208
00:09:45,260 --> 00:09:41,790
15 that's based on hydrophobicity you

209
00:09:47,390 --> 00:09:45,270
see absorbance a 200 meters that's gonna

210
00:09:50,180 --> 00:09:47,400
give us the absorbance of the

211
00:09:53,930 --> 00:09:50,190
Estrin amide bonds in the system over a

212
00:09:56,060 --> 00:09:53,940
tension time so the shorter the

213
00:09:59,270 --> 00:09:56,070

retention time the more hydrophilic the

214
00:10:01,310 --> 00:09:59,280
compound is so as time goes by we'll see

215
00:10:04,340 --> 00:10:01,320
the longer species which are more

216
00:10:08,510 --> 00:10:04,350
hydrophobic you can see over drying time

217
00:10:10,970 --> 00:10:08,520
this is at 65 degrees Celsius that we

218
00:10:13,130 --> 00:10:10,980
start to form these we start to stitch

219
00:10:14,540 --> 00:10:13,140
these units together and it's really

220
00:10:17,150 --> 00:10:14,550
nice because everything that we do

221
00:10:19,370 --> 00:10:17,160
really is forming these extra bonds and

222
00:10:25,180 --> 00:10:19,380
what we're making is a new backbone

223
00:10:30,110 --> 00:10:27,740
then we ask are we gonna get some

224
00:10:33,560 --> 00:10:30,120
structures once we polymerize this

225
00:10:36,320 --> 00:10:33,570
peptide so when we start with a glycolic

226
00:10:38,420 --> 00:10:36,330
acid alanine these properties are shown

227
00:10:41,690 --> 00:10:38,430
in the scanning am right here scanning

228
00:10:44,030 --> 00:10:41,700
electron microscopy these these samples

229
00:10:47,570 --> 00:10:44,040
or this path lights are really oily like

230
00:10:50,200 --> 00:10:47,580
in nature but once we put a polymer

231
00:10:52,850 --> 00:10:50,210
either once we dry them in addition to

232
00:10:55,280 --> 00:10:52,860
seeing the polymers we also start seeing

233
00:10:57,860 --> 00:10:55,290
some structures formed with gates these

234
00:11:00,740 --> 00:10:57,870
fibrils and we think that what happens

235
00:11:03,380 --> 00:11:00,750
is that once we took these two glycolic

236
00:11:05,090 --> 00:11:03,390
acid on in and we polymerize it we think

237
00:11:08,120 --> 00:11:05,100
that we're mimicking a really well-known

238
00:11:10,340 --> 00:11:08,130

motif in biology which is the glycine

239
00:11:12,790 --> 00:11:10,350
alanine repeat motif from silk fibrian's

240
00:11:15,699 --> 00:11:12,800
in which they form the glycine earlier

241
00:11:17,710 --> 00:11:15,709
form these nice Bereshit structures so

242
00:11:20,680 --> 00:11:17,720
we think that once we polymer the

243
00:11:23,259 --> 00:11:20,690
peptide some portion of it can form

244
00:11:28,269 --> 00:11:23,269
these fibrils similar to the glycine

245
00:11:30,940 --> 00:11:28,279
alanine in film the next question is can

246
00:11:32,290 --> 00:11:30,950
we go back so we have the structure

247
00:11:34,389 --> 00:11:32,300
information we have the polymerization

248
00:11:37,480 --> 00:11:34,399
that I told you reversibility is a

249
00:11:39,759 --> 00:11:37,490
really important issue so can we go back

250
00:11:42,550 --> 00:11:39,769
and hydrolyze it and go back to the

251
00:11:45,160 --> 00:11:42,560
starting material the answer is yes we

252
00:11:47,110 --> 00:11:45,170
can so if we take the preformed

253
00:11:50,440 --> 00:11:47,120
oligomers so now we have many ester

254
00:11:53,500 --> 00:11:50,450
bonds you can see incubation in water as

255
00:11:57,610 --> 00:11:53,510
65 degrees so we can actually go from a

256
00:11:58,960 --> 00:11:57,620
distribution of oligomers to a shift

257
00:12:02,680 --> 00:11:58,970
towards the lower molecular weight

258
00:12:05,350 --> 00:12:02,690
species so actually the gradation and I

259
00:12:08,050 --> 00:12:05,360
want to say that the degradation is

260
00:12:10,960 --> 00:12:08,060
again just off the ester bonds so left

261
00:12:13,720 --> 00:12:10,970
to the red molecule so we're really we

262
00:12:15,250 --> 00:12:13,730
have this unit in this case our hydroxy

263
00:12:19,019 --> 00:12:15,260

amino acid that means being stitched

264
00:12:24,449 --> 00:12:19,029
together when we draw it and it's been

265
00:12:27,670 --> 00:12:24,459
degraded as a unit when we hydrolyze it

266
00:12:30,190 --> 00:12:27,680
so we had reversibility and the next

267
00:12:32,139 --> 00:12:30,200
step was making the system a bit more

268
00:12:34,660 --> 00:12:32,149
complicated and see what happens when we

269
00:12:37,720 --> 00:12:34,670
have mixtures of of these shortstack

270
00:12:39,850 --> 00:12:37,730
tight and in collaboration with Martin

271
00:12:42,430 --> 00:12:39,860
solana is a grad students in the HUD lab

272
00:12:44,590 --> 00:12:42,440
so I showed you glycolic acid alanine

273
00:12:47,470 --> 00:12:44,600
but Martin synthesized other molecules

274
00:12:50,769 --> 00:12:47,480
and glycolic do I seem like acid alanine

275
00:12:53,560 --> 00:12:50,779
lactic acid glycine lactic acid is the

276
00:12:56,170 --> 00:12:53,570
hydroxy as an analogue of alanine so we

277
00:12:59,290 --> 00:12:56,180
just have the methyl group here in the

278
00:13:01,530 --> 00:12:59,300
force of the glycolic acid and what we

279
00:13:04,449 --> 00:13:01,540
wanted to see is what happens if we

280
00:13:06,819 --> 00:13:04,459
going to make a complicated mixture but

281
00:13:08,889 --> 00:13:06,829
first we just had to make sure that all

282
00:13:10,930 --> 00:13:08,899
of these packets polymerize when we dry

283
00:13:14,550 --> 00:13:10,940
them so you see like glycolic acid I

284
00:13:17,019 --> 00:13:14,560
mean you see the different polymers

285
00:13:18,970 --> 00:13:17,029
perhaps I did mention two means two

286
00:13:21,430 --> 00:13:18,980
units of glycolic acid I mean and so on

287
00:13:25,900 --> 00:13:21,440
so all of these packages are forming

288
00:13:26,190 --> 00:13:25,910

polymers and when we looked at the big

289
00:13:29,820 --> 00:13:26,200
red

290
00:13:33,150 --> 00:13:29,830
of these peptides as deficit bastards we

291
00:13:34,710 --> 00:13:33,160
know that the the ones with the lactic

292
00:13:37,080 --> 00:13:34,720
acid so with the metal here are much

293
00:13:39,780 --> 00:13:37,090
more stable so we said let's take the

294
00:13:42,000 --> 00:13:39,790
one one was electric I said one with

295
00:13:44,550 --> 00:13:42,010
glycolic I said put them together and

296
00:13:46,050 --> 00:13:44,560
then see if we have selection once we

297
00:13:48,060 --> 00:13:46,060
have the gradation in the West face

298
00:13:50,250 --> 00:13:48,070
towards the lactic acid containing one

299
00:13:52,800 --> 00:13:50,260
so we took glycolysis the glides near

300
00:13:56,330 --> 00:13:52,810
lactic acid I mean we dried them so in

301
00:14:00,840 --> 00:13:56,340
foreign polymers and then we hydrolyze

302
00:14:03,810 --> 00:14:00,850
after some drying time we got polymers

303
00:14:05,820 --> 00:14:03,820
so you can see in red polymers of

304
00:14:08,970 --> 00:14:05,830
glycolic of the glycine so that's two

305
00:14:10,950 --> 00:14:08,980
three four of glycolic acid glycine some

306
00:14:14,910 --> 00:14:10,960
homo polymers of lactic acid all in

307
00:14:17,250 --> 00:14:14,920
green right here and then we also got

308
00:14:20,720 --> 00:14:17,260
copolymer is composed of both glycolic

309
00:14:23,970 --> 00:14:20,730
acid glycine and lactic acid alanine

310
00:14:26,760 --> 00:14:23,980
like these ones now once we are

311
00:14:28,920 --> 00:14:26,770
hydrolyzed these ducts it back they that

312
00:14:31,560 --> 00:14:28,930
are formed we see that after hydrolysis

313
00:14:33,450 --> 00:14:31,570

or after degradation time in water we

314
00:14:34,830 --> 00:14:33,460
see that the ones that survive the most

315
00:14:37,770 --> 00:14:34,840
and the ones that are enriched with

316
00:14:39,330 --> 00:14:37,780
lactic acid so we were able to show some

317
00:14:43,440 --> 00:14:39,340
collection based on chemical stability

318
00:14:45,270 --> 00:14:43,450
of deficit baptize in your system and I

319
00:14:47,700 --> 00:14:45,280
hope I convinced you today that dr. Graf

320
00:14:50,310 --> 00:14:47,710
aid can be a plausible part of the

321
00:14:52,610 --> 00:14:50,320
peptide backbone first we're able to

322
00:14:55,380 --> 00:14:52,620
polymerize the FC package very readily

323
00:14:57,900 --> 00:14:55,390
we can even see some structures formed

324
00:15:00,060 --> 00:14:57,910
by them and last really importantly

325
00:15:02,610 --> 00:15:00,070
we're also able to recycle and really

326
00:15:04,650 --> 00:15:02,620
sample this huge asked sequence

327
00:15:07,650 --> 00:15:04,660
structural space so we'll be able to

328
00:15:09,510 --> 00:15:07,660
hopefully get some sequences this will

329
00:15:14,580 --> 00:15:09,520
give us rights to structures that might

330
00:15:16,560 --> 00:15:14,590
be functional and I don't have thanks

331
00:15:18,840 --> 00:15:16,570
for moving forward but I'd love to talk

332
00:15:23,580 --> 00:15:18,850
to you if you have any questions please

333
00:15:26,160 --> 00:15:23,590
go to see Martinez Martinez poster today

334
00:15:28,340 --> 00:15:26,170
because Marty and I have a library of

335
00:15:30,080 --> 00:15:28,350
fact ideas are tough they emphasized by

336
00:15:33,600 --> 00:15:30,090
Martine and

337
00:15:35,580 --> 00:15:33,610
we explore some interesting features on

338
00:15:39,570 --> 00:15:35,590

these making the system more complicated

339
00:15:40,050 --> 00:15:39,580
looking for some selection so without

340
00:15:43,650 --> 00:15:40,060
like

341
00:15:46,890 --> 00:15:43,660
think the piace I worked with dr. HOD

342
00:15:51,270 --> 00:15:46,900
dr. Williamson dr. Glover I would like

343
00:15:54,360 --> 00:15:51,280
to thank my lab members especially

344
00:15:56,400 --> 00:15:54,370
Martin worth work have mentioned the

345
00:16:12,330 --> 00:15:56,410
funding agencies and thank you for

346
00:16:16,140 --> 00:16:12,340
listening questions so I was wondering

347
00:16:17,340 --> 00:16:16,150
about the sort of the additional and and

348
00:16:20,120 --> 00:16:17,350
the reversibility and how the

349
00:16:23,640 --> 00:16:20,130
reversibility is really important but

350
00:16:28,020 --> 00:16:23,650
sort of the the enrichment process and

351
00:16:29,760 --> 00:16:28,030
just kind of how you know you want

352
00:16:31,920 --> 00:16:29,770
reversibility but you also want some

353
00:16:33,000 --> 00:16:31,930
sort of progress if it were and so

354
00:16:35,760 --> 00:16:33,010
what's what's sort of the balance

355
00:16:37,740 --> 00:16:35,770
between those two processes yes so we

356
00:16:40,530 --> 00:16:37,750
really need the reversibility part is

357
00:16:42,390 --> 00:16:40,540
really important for trying out

358
00:16:46,560 --> 00:16:42,400
different sequences but the premise is

359
00:16:48,090 --> 00:16:46,570
that if we have some sequences that can

360
00:16:50,340 --> 00:16:48,100
fold they can from some stable

361
00:16:52,530 --> 00:16:50,350
structures and then they will be stable

362
00:16:54,180 --> 00:16:52,540
even though if they couldn't it could be

363
00:16:56,910 --> 00:16:54,190

a reversible for immunization we think

364
00:16:58,950 --> 00:16:56,920
that if we have some structures or if we

365
00:17:01,140 --> 00:16:58,960
have a co-equal have binding to a

366
00:17:03,570 --> 00:17:01,150
cofactor for instance so we have some

367
00:17:05,130 --> 00:17:03,580
ways to stabilize the structure one so

368
00:17:08,240 --> 00:17:05,140
the ones that are not functional not

369
00:17:10,980 --> 00:17:08,250
structured they will be the grade and

370
00:17:12,870 --> 00:17:10,990
put back recycled into the prebiotic

371
00:17:15,240 --> 00:17:12,880
soup and then we can build some more and

372
00:17:18,660 --> 00:17:15,250
turn restore some that's the Baptizer

373
00:17:25,380 --> 00:17:18,670
more favorable okay great Thanks other

374
00:17:27,480 --> 00:17:25,390
questions yes so sort of piggybacking on

375
00:17:29,220 --> 00:17:27,490
that idea of stabilizing the structure

376
00:17:31,500 --> 00:17:29,230
have you thought about while I'm sure

377
00:17:34,010 --> 00:17:31,510
you thought about but do you have any

378
00:17:38,340 --> 00:17:34,020
plans to do things with like different

379
00:17:39,930 --> 00:17:38,350
like clays or sediment or other

380
00:17:43,620 --> 00:17:39,940
cofactors present those kinds of

381
00:17:46,220 --> 00:17:43,630
experiments yes definitely direction

382
00:17:48,660 --> 00:17:46,230
that we take we want to be able to

383
00:17:56,880 --> 00:17:48,670
select based on structure on the

384
00:18:05,159 --> 00:18:01,930
a slightly silly question why the why

385
00:18:07,330 --> 00:18:05,169
starting specifically from the dimer

386
00:18:09,159 --> 00:18:07,340
starting points rather than just like a

387
00:18:11,169 --> 00:18:09,169
mixture of the monomer is that just to

388
00:18:13,240 --> 00:18:11,179

sort of get things going faster or make

389
00:18:18,820 --> 00:18:13,250
the products larger or something more

390
00:18:20,830 --> 00:18:18,830
yes so we find out no no that we had a

391
00:18:22,480 --> 00:18:20,840
lot of time for a chemical of volition

392
00:18:25,270 --> 00:18:22,490
but we kind of want to speed up the

393
00:18:27,610 --> 00:18:25,280
process and see and be able to speed up

394
00:18:30,190 --> 00:18:27,620
things so we think that because we know

395
00:18:31,930 --> 00:18:30,200
the chemistry so we know that we can

396
00:18:34,029 --> 00:18:31,940
make these peptides with a drug see an

397
00:18:36,640 --> 00:18:34,039
amino acid we know that they will be

398
00:18:40,539 --> 00:18:36,650
enriched after a wet cycle after some

399
00:18:42,549 --> 00:18:40,549
heating time we want to kind of just

400
00:18:45,159 --> 00:18:42,559
make it more simple so we'll be able to

401
00:18:47,049 --> 00:18:45,169
see things and not working with at this

402
00:18:48,850 --> 00:18:47,059
point with a complicated mixture that

403
00:18:51,640 --> 00:18:48,860
will be just they're just harder to

404
00:18:54,039 --> 00:18:51,650
analyze and so gain some insights from

405
00:18:58,779 --> 00:18:54,049
them but we just think we just want to

406
00:19:00,610 --> 00:18:58,789
speed up the things to simplify okay