1
00:00:05,990 --> 00:00:03,590
as we get ready to

2
00:00:07,990 --> 00:00:06,000
see the launch of the next crew to space

3
00:00:09,669 --> 00:00:08,000
the crew members who are already on

4
00:00:12,310 --> 00:00:09,679
board the international space station

5
00:00:13,830 --> 00:00:12,320
are continuing to work on the variety of

6
00:00:16,550 --> 00:00:13,840
science there

7
00:00:18,310 --> 00:00:16,560
there is still a series of tests going

8
00:00:20,790 --> 00:00:18,320
on board the international space station

9
00:00:23,269 --> 00:00:20,800
today that started before the

10
00:00:25,589 --> 00:00:23,279
construction of the space station began

11
00:00:28,470 --> 00:00:25,599
back when the space shuttle was our only

12
00:00:30,790 --> 00:00:28,480
orbiting science laboratory lori meigs

13
00:00:32,630 --> 00:00:30,800

joins us from the payload operations

14
00:00:34,470 --> 00:00:32,640
integration center at the marshall space

15
00:00:36,950 --> 00:00:34,480
flight center in huntsville alabama this

16
00:00:39,430 --> 00:00:36,960
morning to talk about growing protein

17
00:00:41,190 --> 00:00:39,440
crystals in microgravity

18
00:00:43,270 --> 00:00:41,200
that's right that very subject protein

19
00:00:45,190 --> 00:00:43,280
crystal growth is proving useful in the

20
00:00:47,029 --> 00:00:45,200
design of new pharmaceuticals

21
00:00:48,869 --> 00:00:47,039
specifically a drug to prevent

22
00:00:50,470 --> 00:00:48,879
duchenne's muscular dystrophy that's

23
00:00:52,389 --> 00:00:50,480
where there is a defective gene for

24
00:00:53,750 --> 00:00:52,399
proteins in the muscles i had the

25
00:00:55,830 --> 00:00:53,760
opportunity to speak with the lead

26
00:00:58,950 --> 00:00:55,840
investigator for this project

27
00:01:00,389 --> 00:00:58,960
at the bio osaka biotechnology institute

28
00:01:04,310 --> 00:01:00,399
in japan

29
00:01:07,350 --> 00:01:04,320
i studied pretty protein crystallography

30
00:01:09,109 --> 00:01:07,360
to know the total structure of the

31
00:01:12,149 --> 00:01:09,119
various protein

32
00:01:13,190 --> 00:01:12,159
and also now is we try to make a good

33
00:01:15,830 --> 00:01:13,200
drug

34
00:01:17,030 --> 00:01:15,840
used for the the prevention of the

35
00:01:19,190 --> 00:01:17,040
muscle

36
00:01:20,950 --> 00:01:19,200
and loss of the duchenne muscular

37
00:01:24,270 --> 00:01:20,960
dystrophy

38
00:01:27,350 --> 00:01:24,280

to design the drug so we used the

39
00:01:28,469 --> 00:01:27,360
crystallization of the protein and drug

40
00:01:30,469 --> 00:01:28,479
complex

41
00:01:32,469 --> 00:01:30,479
and the microgravity condition in

42
00:01:34,230 --> 00:01:32,479
international space station

43
00:01:35,990 --> 00:01:34,240
why did you want to study protein

44
00:01:39,030 --> 00:01:36,000
crystal growth at first so

45
00:01:41,350 --> 00:01:39,040
yeah the original idea is just these

46
00:01:44,069 --> 00:01:41,360
several researchers proposed that the

47
00:01:45,429 --> 00:01:44,079
microgravity is very effective

48
00:01:47,350 --> 00:01:45,439
to prepare

49
00:01:48,870 --> 00:01:47,360
the very ordered structures of the high

50
00:01:50,789 --> 00:01:48,880
quality crystal

51
00:01:54,310 --> 00:01:50,799
but we are not sure

52
00:01:56,630 --> 00:01:54,320
then that the one day is the jaxa

53
00:01:58,149 --> 00:01:56,640
previously named nasda of the japanese

54
00:02:00,709 --> 00:01:58,159
space agency

55
00:02:02,709 --> 00:02:00,719
give us a chance to participate in the

56
00:02:07,270 --> 00:02:02,719
space shuttle project

57
00:02:09,669 --> 00:02:07,280
to check the crystal quality growing the

58
00:02:11,750 --> 00:02:09,679
microgravity condition of space shuttle

59
00:02:14,470 --> 00:02:11,760
that is our starting point

60
00:02:16,710 --> 00:02:14,480
then by combination of the microgravity

61
00:02:18,869 --> 00:02:16,720
to prepare high quality crystal

62
00:02:22,070 --> 00:02:18,879
and also the using the

63
00:02:23,190 --> 00:02:22,080

super power x-ray to define fine

64
00:02:26,150 --> 00:02:23,200
structures

65
00:02:29,589 --> 00:02:26,160
so those combination is very very useful

66
00:02:32,710 --> 00:02:29,599
to understand why the how that chemical

67
00:02:34,949 --> 00:02:32,720
structure bound to the target protein

68
00:02:38,150 --> 00:02:34,959
that completely the the the fine

69
00:02:41,750 --> 00:02:38,160
structures of the target cavity we can

70
00:02:44,150 --> 00:02:41,760
design much more better structured drug

71
00:02:46,710 --> 00:02:44,160
so diagnosis is very easy because that

72
00:02:49,350 --> 00:02:46,720
disease is a genetic due to the genetic

73
00:02:51,190 --> 00:02:49,360
mutation of this ring gene

74
00:02:52,390 --> 00:02:51,200
therefore the diagnosis is very easy to

75
00:02:54,790 --> 00:02:52,400
buy genetic

76
00:02:56,949 --> 00:02:54,800
diagnosis but

77
00:02:58,550 --> 00:02:56,959
no therapy at all

78
00:03:01,750 --> 00:02:58,560
nothing to do

79
00:03:02,869 --> 00:03:01,760
and year by year the boys the muscle was

80
00:03:04,949 --> 00:03:02,879
breaking

81
00:03:06,149 --> 00:03:04,959
and at the end of the junior school they

82
00:03:07,589 --> 00:03:06,159
have to use

83
00:03:10,390 --> 00:03:07,599
reading chairs

84
00:03:12,470 --> 00:03:10,400
once they start to use the relief chairs

85
00:03:13,670 --> 00:03:12,480
muscle was much more weak in the

86
00:03:14,630 --> 00:03:13,680
laboratory

87
00:03:17,589 --> 00:03:14,640
and

88
00:03:19,190 --> 00:03:17,599

until the 20 years old

89
00:03:22,229 --> 00:03:19,200
they have to use

90
00:03:25,270 --> 00:03:22,239
actual aspiration machine

91
00:03:26,149 --> 00:03:25,280
then okay they can maintain the life 20

92
00:03:28,390 --> 00:03:26,159
years

93
00:03:31,830 --> 00:03:28,400
more but

94
00:03:33,990 --> 00:03:31,840
finally is respiration is very difficult

95
00:03:36,149 --> 00:03:34,000
most boys will die

96
00:03:38,550 --> 00:03:36,159
by the the spiritual healer or the

97
00:03:39,990 --> 00:03:38,560
heartbeat

98
00:03:41,990 --> 00:03:40,000
but once we

99
00:03:44,949 --> 00:03:42,000
found the

100
00:03:47,670 --> 00:03:44,959
good drug candidates and i

101
00:03:50,550 --> 00:03:47,680
administer those that are candid to the

102
00:03:51,270 --> 00:03:50,560
model animal of dmd

103
00:03:53,750 --> 00:03:51,280
so

104
00:03:56,070 --> 00:03:53,760
without touching the energy gene

105
00:03:57,190 --> 00:03:56,080
we can slow down the progression of the

106
00:03:59,350 --> 00:03:57,200
disease

107
00:04:01,750 --> 00:03:59,360
how did you make the connection

108
00:04:04,149 --> 00:04:01,760
between duchesne's muscular dystrophy

109
00:04:05,990 --> 00:04:04,159
and your protein crystal growth it was

110
00:04:08,390 --> 00:04:06,000
really the

111
00:04:09,670 --> 00:04:08,400
suddenly accidental finding almost 10

112
00:04:11,589 --> 00:04:09,680
years ago

113
00:04:14,949 --> 00:04:11,599

one doctor called students of the

114
00:04:18,390 --> 00:04:14,959
department of pediatrics of the

115
00:04:22,310 --> 00:04:18,400
neighboring university visited my office

116
00:04:24,150 --> 00:04:22,320
and he found that is the

117
00:04:25,590 --> 00:04:24,160
normal

118
00:04:29,030 --> 00:04:25,600
histological

119
00:04:31,670 --> 00:04:29,040
studies he found our

120
00:04:32,550 --> 00:04:31,680
enzyme is also upregulated

121
00:04:35,189 --> 00:04:32,560
in the

122
00:04:37,590 --> 00:04:35,199
damaged the smooth muscle

123
00:04:39,670 --> 00:04:37,600
of the at the patient with the

124
00:04:41,510 --> 00:04:39,680
lucian's muscular dystrophy

125
00:04:43,430 --> 00:04:41,520
so until that time i did not know

126
00:04:45,110 --> 00:04:43,440
anything about the dmd

127
00:04:48,230 --> 00:04:45,120
but then he

128
00:04:50,230 --> 00:04:48,240
explained how serious that disease by

129
00:04:53,749 --> 00:04:50,240
using the chemical drug

130
00:04:56,230 --> 00:04:53,759
that we can the houses that control the

131
00:04:58,469 --> 00:04:56,240
drug phenotype now genotype we cannot

132
00:05:00,550 --> 00:04:58,479
touch it even though there is okay we

133
00:05:02,870 --> 00:05:00,560
can control the phenotype just like a

134
00:05:05,670 --> 00:05:02,880
case of hiv

135
00:05:08,150 --> 00:05:05,680
so now is to 10 years or 20 years later

136
00:05:11,909 --> 00:05:08,160
so many people died by hiv

137
00:05:16,469 --> 00:05:15,270
most cases we can control i want to

138
00:05:19,110 --> 00:05:16,479

realize

139
00:05:21,830 --> 00:05:19,120
their drug distributed new drugs for

140
00:05:23,430 --> 00:05:21,840
every patient everywhere and is a very

141
00:05:25,670 --> 00:05:23,440
steep price

142
00:05:27,350 --> 00:05:25,680
this is my dream

143
00:05:29,830 --> 00:05:27,360
and that just shows you that research

144
00:05:31,510 --> 00:05:29,840
can take years but the results are

145
00:05:33,350 --> 00:05:31,520
well worth the wait very interesting

146
00:05:34,950 --> 00:05:33,360
research there and taking a live look in

147
00:05:36,790 --> 00:05:34,960
the payload operations integration

148
00:05:39,270 --> 00:05:36,800
center mike faust is the payload

149
00:05:41,270 --> 00:05:39,280
operations director today and they are

150
00:05:43,189 --> 00:05:41,280
getting ready with all the excitement

151
00:05:45,029 --> 00:05:43,199
with the new launch of a new crew and

152
00:05:47,270 --> 00:05:45,039
that means a lot of exciting new work