1
00:00:07,749 --> 00:00:05,590
samples from the maiden voyage of nasa's

2
00:00:09,910 --> 00:00:07,759
rodent research project will return to

3
00:00:12,070 --> 00:00:09,920
earth on the spacex five dragon that's

4
00:00:14,310 --> 00:00:12,080
scheduled for february 10th we had the

5
00:00:16,230 --> 00:00:14,320
opportunity to visit the lab where those

6
00:00:17,990 --> 00:00:16,240
samples will be studied at nasa's ames

7
00:00:19,990 --> 00:00:18,000
research center

8
00:00:21,910 --> 00:00:20,000
so there are vials and scales we're in a

9
00:00:24,390 --> 00:00:21,920
lab ruth tell us about it

10
00:00:26,790 --> 00:00:24,400
well this is a research lab this is my

11
00:00:29,109 --> 00:00:26,800
lab here at nasa ames research center

12
00:00:31,750 --> 00:00:29,119
and i'm here i work also as a project

13
00:00:33,830 --> 00:00:31,760

scientist for the rodent research

14
00:00:35,910 --> 00:00:33,840
project and this is where the actual

15
00:00:38,869 --> 00:00:35,920
samples and tissues come to for analysis

16
00:00:41,990 --> 00:00:38,879
right that's right we get the tissues we

17
00:00:44,549 --> 00:00:42,000
process them and purify

18
00:00:46,630 --> 00:00:44,559
components like the rna the protein

19
00:00:49,510 --> 00:00:46,640
and then we can take those and do more

20
00:00:52,069 --> 00:00:49,520
detailed analysis why do we do all this

21
00:00:54,069 --> 00:00:52,079
well because well for two big reasons

22
00:00:57,510 --> 00:00:54,079
one is because we want to understand the

23
00:00:59,349 --> 00:00:57,520
basic biology of how organisms and

24
00:01:01,189 --> 00:00:59,359
mammals and humans respond to the

25
00:01:03,349 --> 00:01:01,199
spaceflight environment

26
00:01:04,549 --> 00:01:03,359
another reason is we want to find ways

27
00:01:06,469 --> 00:01:04,559
to

28
00:01:08,550 --> 00:01:06,479
improve

29
00:01:10,870 --> 00:01:08,560
human health on earth and

30
00:01:13,910 --> 00:01:10,880
mitigate some of the adverse effects of

31
00:01:16,390 --> 00:01:13,920
space flight on the human crew

32
00:01:18,390 --> 00:01:16,400
so samples from the first flight

33
00:01:21,190 --> 00:01:18,400
are headed back to earth what happens to

34
00:01:23,510 --> 00:01:21,200
them exactly once they return to earth

35
00:01:26,550 --> 00:01:23,520
well after they're they're brought to

36
00:01:28,550 --> 00:01:26,560
our our facility our laboratory we go in

37
00:01:30,469 --> 00:01:28,560
and we remove the tissues

38
00:01:33,270 --> 00:01:30,479

and we take them through a series of

39
00:01:35,510 --> 00:01:33,280
processing steps to purify rna

40
00:01:37,830 --> 00:01:35,520
we also take that's we'll be doing that

41
00:01:38,710 --> 00:01:37,840
with the spleens with the livers we'll

42
00:01:40,789 --> 00:01:38,720
be

43
00:01:42,950 --> 00:01:40,799
lysing tissue from the livers and

44
00:01:44,870 --> 00:01:42,960
preparing samples and analyzing it for

45
00:01:46,950 --> 00:01:44,880
enzymes and proteins

46
00:01:49,990 --> 00:01:46,960
the tissues after we've done our initial

47
00:01:52,630 --> 00:01:50,000
analysis and essentially proven

48
00:01:56,709 --> 00:01:52,640
demonstrated that the samples have been

49
00:01:58,789 --> 00:01:56,719
recovered and stored and

50
00:02:00,230 --> 00:01:58,799
collected and analyzed

51
00:02:02,550 --> 00:02:00,240
to that point

52
00:02:05,590 --> 00:02:02,560
adequately then we can provide those

53
00:02:08,389 --> 00:02:05,600
samples out to others so

54
00:02:11,750 --> 00:02:08,399
here at ames and at delta space center

55
00:02:13,270 --> 00:02:11,760
nasa provides an archive of tissues that

56
00:02:15,190 --> 00:02:13,280
can be made available to other

57
00:02:16,949 --> 00:02:15,200
scientists to go in and really kind of

58
00:02:19,670 --> 00:02:16,959
do a deep dive

59
00:02:22,390 --> 00:02:19,680
into gene expression and

60
00:02:24,229 --> 00:02:22,400
functional analyses how does this

61
00:02:26,229 --> 00:02:24,239
benefit us here on earth how does

62
00:02:28,710 --> 00:02:26,239
studying the tissues and the samples

63
00:02:31,509 --> 00:02:28,720

from these rodents help us well when we

64
00:02:34,790 --> 00:02:31,519
understand the underlying mechanism and

65
00:02:37,670 --> 00:02:34,800
and development pathogenesis a bit of a

66
00:02:41,030 --> 00:02:37,680
of a disease or a response to an adverse

67
00:02:43,589 --> 00:02:41,040
stimulus then we can better intervene

68
00:02:45,910 --> 00:02:43,599
so most drug development

69
00:02:47,990 --> 00:02:45,920
almost all the drug development now has

70
00:02:50,070 --> 00:02:48,000
gone through phases where

71
00:02:52,309 --> 00:02:50,080
testing using rodents or other

72
00:02:54,470 --> 00:02:52,319
experimental animals

73
00:02:57,350 --> 00:02:54,480
is part of that processes process and

74
00:02:59,750 --> 00:02:57,360
that's what needs to happen in order to

75
00:03:02,309 --> 00:02:59,760
understand both

76
00:03:04,149 --> 00:03:02,319
whether it's beneficial whether it works

77
00:03:07,110 --> 00:03:04,159
and what the you know what the

78
00:03:10,470 --> 00:03:07,120
consequences are of of of treatment like

79
00:03:12,550 --> 00:03:10,480
that now when we understand the basic

80
00:03:14,869 --> 00:03:12,560
mechanism that allows us to really

81
00:03:16,550 --> 00:03:14,879
target can we can we do something to

82
00:03:18,550 --> 00:03:16,560
prevent that through uh through a

83
00:03:21,110 --> 00:03:18,560
physical maneuver through prevention

84
00:03:23,509 --> 00:03:21,120
rather than treating after an adverse

85
00:03:25,509 --> 00:03:23,519
effect has developed such as bone loss

86
00:03:27,430 --> 00:03:25,519
or muscle atrophy which we know occurs

87
00:03:29,430 --> 00:03:27,440
in space

88
00:03:31,030 --> 00:03:29,440

so is this lab any different from any

89
00:03:32,550 --> 00:03:31,040
lab we'd see on the ground i mean is

90
00:03:35,750 --> 00:03:32,560
there anything different or unique about

91
00:03:38,470 --> 00:03:35,760
this lab well my own personal lab

92
00:03:40,550 --> 00:03:38,480
research involves looking at at bone so

93
00:03:42,470 --> 00:03:40,560
we have some special tools that allow us

94
00:03:44,710 --> 00:03:42,480
in equipment that allow us to analyze

95
00:03:46,630 --> 00:03:44,720
the micro architecture and the structure

96
00:03:49,350 --> 00:03:46,640
as well as the mechanical properties of

97
00:03:52,149 --> 00:03:49,360
bone but this lab has

98
00:03:54,070 --> 00:03:52,159
has all of the basic biochemical and

99
00:03:55,910 --> 00:03:54,080
molecular reagents and processing

100
00:03:58,149 --> 00:03:55,920
capability that you see

101
00:04:00,149 --> 00:03:58,159
with any molecular biology lab you would

102
00:04:02,390 --> 00:04:00,159
see an academic in an academic

103
00:04:05,670 --> 00:04:02,400
institution a biotech company a big

104
00:04:09,589 --> 00:04:05,680
pharma company that they use to really

105
00:04:11,270 --> 00:04:09,599
develop their tissue analysis capability

106
00:04:12,789 --> 00:04:11,280
and mark faust is leading the team here

107
00:04:14,229 --> 00:04:12,799
in the payload operations integration

108
00:04:16,229 --> 00:04:14,239
center they're preparing those samples

109
00:04:18,069 --> 00:04:16,239
and many many other things they're

110
00:04:20,469 --> 00:04:18,079
working with the crew to get all of that

111
00:04:21,909 --> 00:04:20,479
on board the dragon to return to earth

112
00:04:23,749 --> 00:04:21,919
before we leave we wanted to mention

113
00:04:25,590 --> 00:04:23,759

that the winners of the future engineers

114
00:04:27,830 --> 00:04:25,600
3d printing and space tool challenge

115
00:04:31,350 --> 00:04:27,840
were announced the winner from the teen

116
00:04:33,030 --> 00:04:31,360
group ages 13 to 19 was a multi-purpose

117
00:04:35,510 --> 00:04:33,040
precision maintenance tool that robert

118
00:04:37,270 --> 00:04:35,520
hillen of enterprise alabama designed

119
00:04:40,230 --> 00:04:37,280
and the winner of the junior group ages

120
00:04:42,710 --> 00:04:40,240
5 to 12 was a space planter that sydney

121
00:04:44,150 --> 00:04:42,720
vernon from bellevue washington designed

122
00:04:46,310 --> 00:04:44,160
now this challenge asks students in

123
00:04:48,550 --> 00:04:46,320
grades k through 12 to use their

124
00:04:50,550 --> 00:04:48,560
imagination to create and submit a

125
00:04:53,030 --> 00:04:50,560
digital 3d model of a tool they think

126
00:04:54,790 --> 00:04:53,040
astronauts could use in space and the

127
00:04:57,110 --> 00:04:54,800
team winner will be here in the payload