
NASA
SPACESTATION
LIVE

1
00:00:09,589 --> 00:00:07,510
the international space station is being

2
00:00:11,990 --> 00:00:09,599
used by scientists from all over the

3
00:00:14,230 --> 00:00:12,000
world to conduct research

4
00:00:17,349 --> 00:00:14,240
that can support future space flight but

5
00:00:19,590 --> 00:00:17,359
also to improve life for people on earth

6
00:00:23,109 --> 00:00:19,600
one such experiment now underway is

7
00:00:25,670 --> 00:00:23,119
using mice as stand-ins for humans to

8
00:00:27,990 --> 00:00:25,680
assess how well a new compound works to

9
00:00:28,950 --> 00:00:28,000
prevent skeletal muscle wasting and

10
00:00:30,550 --> 00:00:28,960
weakness

11
00:00:32,549 --> 00:00:30,560
that's a condition that's faced by

12
00:00:33,830 --> 00:00:32,559
astronauts during a long duration stay

13
00:00:35,350 --> 00:00:33,840

in weightlessness

14
00:00:37,590 --> 00:00:35,360
of course it's also a condition that's

15
00:00:39,910 --> 00:00:37,600
experienced by many people on earth

16
00:00:42,709 --> 00:00:39,920
recently my colleague amiko carter spoke

17
00:00:45,590 --> 00:00:42,719
with dr rosamond smith she's a research

18
00:00:47,510 --> 00:00:45,600
fellow at eli lillian company and is the

19
00:00:49,590 --> 00:00:47,520
principal investigator of the rodent

20
00:00:52,069 --> 00:00:49,600
research 3 mission

21
00:00:54,630 --> 00:00:52,079
amiko asked her to explain why the lack

22
00:00:58,150 --> 00:00:54,640
of gravity in space leads to weakened

23
00:00:59,430 --> 00:00:58,160
muscles for the station crew members

24
00:01:01,189 --> 00:00:59,440
well um

25
00:01:02,950 --> 00:01:01,199
basically our muscles are very

26
00:01:06,710 --> 00:01:02,960
responsive to the amount of resistance

27
00:01:07,670 --> 00:01:06,720
or load that encounter so um for example

28
00:01:09,429 --> 00:01:07,680
when you

29
00:01:12,630 --> 00:01:09,439
lift weights and add more resistance our

30
00:01:15,350 --> 00:01:12,640
muscles get bigger right but when one

31
00:01:17,030 --> 00:01:15,360
has less load or less resistance as you

32
00:01:19,270 --> 00:01:17,040
as happens in the conditions of

33
00:01:21,429 --> 00:01:19,280
microgravity on our muscles our muscles

34
00:01:24,390 --> 00:01:21,439
actually decrease in size or undergo

35
00:01:26,469 --> 00:01:24,400
muscle atrophy or muscle wasting

36
00:01:28,390 --> 00:01:26,479
so we know it happens and

37
00:01:29,910 --> 00:01:28,400
and therefore we do have exercise

38
00:01:32,789 --> 00:01:29,920

equipment aboard the international space

39
00:01:34,469 --> 00:01:32,799
station um so astronauts are exercising

40
00:01:36,550 --> 00:01:34,479
but tell me a little more about this

41
00:01:38,469 --> 00:01:36,560
compound that you are investigating to

42
00:01:40,469 --> 00:01:38,479
help um as a as a possible

43
00:01:42,630 --> 00:01:40,479
countermeasure

44
00:01:44,870 --> 00:01:42,640
well actually so uh

45
00:01:46,870 --> 00:01:44,880
the compound we're developing is uh we

46
00:01:49,749 --> 00:01:46,880
hope to be able to prevent muscle

47
00:01:52,469 --> 00:01:49,759
wasting obviously here at lilly we have

48
00:01:54,389 --> 00:01:52,479
been very interested in

49
00:01:56,789 --> 00:01:54,399
developing this compound for

50
00:01:59,109 --> 00:01:56,799
muscle wasting conditions and uh

51
00:02:01,510 --> 00:01:59,119
diseases that have muscle wasting for

52
00:02:04,230 --> 00:02:01,520
patients on earth but obviously it does

53
00:02:08,790 --> 00:02:04,240
have applications too for astronauts in

54
00:02:11,430 --> 00:02:08,800
space so um yes we're hoping uh that uh

55
00:02:13,589 --> 00:02:11,440
this compound will have activity to be

56
00:02:16,229 --> 00:02:13,599
able to prevent uh muscle wasting

57
00:02:18,550 --> 00:02:16,239
occurring uh not only in people with

58
00:02:21,270 --> 00:02:18,560
diseases that have muscle wasting but

59
00:02:22,390 --> 00:02:21,280
also in the context of microgravity in

60
00:02:23,750 --> 00:02:22,400
space

61
00:02:26,150 --> 00:02:23,760
so you're studying mice in

62
00:02:29,030 --> 00:02:26,160
weightlessness can you tell me what

63
00:02:31,190 --> 00:02:29,040

makes mice a good analog for for

64
00:02:32,949 --> 00:02:31,200
studying you know muscle wasting in

65
00:02:35,509 --> 00:02:32,959
humans

66
00:02:39,670 --> 00:02:35,519
well actually uh it's very interesting

67
00:02:45,110 --> 00:02:42,229
species so actually um

68
00:02:47,350 --> 00:02:45,120
mice are a very good surrogate and

69
00:02:49,270 --> 00:02:47,360
end up being a very good species to look

70
00:02:51,110 --> 00:02:49,280
at muscle wasting obviously they're

71
00:02:53,430 --> 00:02:51,120
smaller and more convenient and easier

72
00:02:55,030 --> 00:02:53,440
to do lots of different measurements and

73
00:02:57,030 --> 00:02:55,040
so uh

74
00:02:59,990 --> 00:02:57,040
it makes sense and we anticipate we'll

75
00:03:02,229 --> 00:03:00,000
learn a lot about what may happen in

76
00:03:05,350 --> 00:03:02,239
people by studying

77
00:03:07,589 --> 00:03:05,360
in mice initially now tell me about the

78
00:03:08,550 --> 00:03:07,599
hardware that is being used for this

79
00:03:10,309 --> 00:03:08,560
investigation and what are the

80
00:03:11,350 --> 00:03:10,319
astronauts doing to help collect the

81
00:03:12,710 --> 00:03:11,360
data

82
00:03:15,430 --> 00:03:12,720
well i was just quite a complex

83
00:03:17,430 --> 00:03:15,440
experiment at last uh six weeks they

84
00:03:19,670 --> 00:03:17,440
they were there's very specialized

85
00:03:21,509 --> 00:03:19,680
hardware just to get the mice up into

86
00:03:23,990 --> 00:03:21,519
the space station they're in a

87
00:03:25,270 --> 00:03:24,000
specialized habitat in the transporter

88
00:03:28,070 --> 00:03:25,280

in the dragon

89
00:03:30,470 --> 00:03:28,080
rocket the spacex rocket dragon capsule

90
00:03:32,869 --> 00:03:30,480
that took them to the space station and

91
00:03:34,229 --> 00:03:32,879
also when they're sort of living in the

92
00:03:36,470 --> 00:03:34,239
space station they're in a special

93
00:03:38,630 --> 00:03:36,480
habitat so that provides them with food

94
00:03:41,350 --> 00:03:38,640
and water and controls the lighting and

95
00:03:43,270 --> 00:03:41,360
the temperature etc but then when we're

96
00:03:46,070 --> 00:03:43,280
actually performing our experiment we

97
00:03:48,550 --> 00:03:46,080
also have other hardware measures body

98
00:03:51,030 --> 00:03:48,560
composition also the grip strength which

99
00:03:53,429 --> 00:03:51,040
is a measure of muscle functioning mice

100
00:03:55,910 --> 00:03:53,439
there's a brand new way in which this

101
00:03:58,070 --> 00:03:55,920
has not been done before in mice on the

102
00:03:59,589 --> 00:03:58,080
space station and to do some of those

103
00:04:02,070 --> 00:03:59,599
measures we have

104
00:04:04,550 --> 00:04:02,080
anesthetized mice

105
00:04:06,630 --> 00:04:04,560
to be able to uh complement measure

106
00:04:08,309 --> 00:04:06,640
their body composition so that's another

107
00:04:10,789 --> 00:04:08,319
specialized piece of hardware that was

108
00:04:11,990 --> 00:04:10,799
designed to be able to allow

109
00:04:15,750 --> 00:04:12,000
us to

110
00:04:18,069 --> 00:04:15,760
uh undergo anesthesia so um this

111
00:04:19,909 --> 00:04:18,079
experiment involves a lot of hands-on

112
00:04:22,710 --> 00:04:19,919
work by the astronauts

113
00:04:24,950 --> 00:04:22,720

i was very fortunate just a few days ago

114
00:04:27,110 --> 00:04:24,960
when uh we were at our four-week time

115
00:04:28,950 --> 00:04:27,120
point in our experiment to go and watch

116
00:04:31,510 --> 00:04:28,960
the live feed from the space station and

117
00:04:34,469 --> 00:04:31,520
see tim peake doing the thumb work on

118
00:04:36,950 --> 00:04:34,479
our experiment um and tim cook or the

119
00:04:39,510 --> 00:04:36,960
other astronaut was doing measures for

120
00:04:41,590 --> 00:04:39,520
the body composition so it takes quite a

121
00:04:44,469 --> 00:04:41,600
lot of astronaut time there

122
00:04:47,350 --> 00:04:44,479
it's very complex measures and

123
00:04:49,510 --> 00:04:47,360
afar so good we're already getting some

124
00:04:51,110 --> 00:04:49,520
exciting data

125
00:04:53,270 --> 00:04:51,120
so it'll be interesting hearing about

126
00:04:55,430 --> 00:04:53,280
the results of this investigation once

127
00:04:57,590 --> 00:04:55,440
it's over and can you tell me though

128
00:05:00,790 --> 00:04:57,600
after studying the results how do you

129
00:05:03,749 --> 00:05:00,800
hope that it will apply to astronauts

130
00:05:06,150 --> 00:05:03,759
but also people living here on earth

131
00:05:08,550 --> 00:05:06,160
well as you can imagine if this if our

132
00:05:11,189 --> 00:05:08,560
experiment is successful and we are able

133
00:05:14,150 --> 00:05:11,199
to fence the muscle wasting the er in

134
00:05:17,430 --> 00:05:14,160
ice in the infant's conditions uh it

135
00:05:19,110 --> 00:05:17,440
will be extra evidence that our compound

136
00:05:21,909 --> 00:05:19,120
can uh

137
00:05:25,110 --> 00:05:21,919
prevent that uh prevent muscle wasting

138
00:05:27,830 --> 00:05:25,120

and of course people include those data

139
00:05:30,710 --> 00:05:27,840
and into our drug discovery efforts as

140
00:05:31,670 --> 00:05:30,720
we're working to develop uh new drugs

141
00:05:34,310 --> 00:05:31,680
and novel

142
00:05:36,710 --> 00:05:34,320
beta drugs to help patients who have

143
00:05:39,189 --> 00:05:36,720
muscle wasting diseases on earth these

144
00:05:41,670 --> 00:05:39,199
are diseases such as muscular dystrophy

145
00:05:44,950 --> 00:05:41,680
als certain types of cancers that

146
00:05:45,749 --> 00:05:44,960
moment there's really no uh no treatment

147
00:05:46,870 --> 00:05:45,759
for

148
00:05:49,270 --> 00:05:46,880
these

149
00:05:50,870 --> 00:05:49,280
muscle wasting diseases

150
00:05:53,510 --> 00:05:50,880
we uh wish you best of luck on this