
NASA
SPACESTATION
LIVE

1
00:00:08,310 --> 00:00:06,630
a good portion of the science work

2
00:00:10,950 --> 00:00:08,320
that's being done on the international

3
00:00:13,749 --> 00:00:10,960
space station is coming here through

4
00:00:15,910 --> 00:00:13,759
universities or government agencies but

5
00:00:17,670 --> 00:00:15,920
not all of it for instance there are

6
00:00:19,189 --> 00:00:17,680
drug companies that are using the

7
00:00:21,830 --> 00:00:19,199
weightless environment on the space

8
00:00:23,590 --> 00:00:21,840
station to improve their products my

9
00:00:25,429 --> 00:00:23,600
colleague lori meggs at the marshall

10
00:00:27,509 --> 00:00:25,439
space flight center in huntsville

11
00:00:29,990 --> 00:00:27,519
alabama recently spoke with a

12
00:00:33,270 --> 00:00:30,000
representative of eli lillian company

13
00:00:35,270 --> 00:00:33,280

which has been in business since 1876

14
00:00:37,510 --> 00:00:35,280
to find out how that company is

15
00:00:38,549 --> 00:00:37,520
utilizing the world's laboratory on

16
00:00:41,030 --> 00:00:38,559
orbit

17
00:00:42,790 --> 00:00:41,040
let's talk about eli lilly's involvement

18
00:00:45,270 --> 00:00:42,800
with the space station that's quite a

19
00:00:48,389 --> 00:00:45,280
combination yeah we've got four

20
00:00:50,790 --> 00:00:48,399
experiments going up at the end of 2015

21
00:00:52,630 --> 00:00:50,800
and into 2016.

22
00:00:55,430 --> 00:00:52,640
and they're really looking at very

23
00:00:57,430 --> 00:00:55,440
different things so we set out uh

24
00:00:59,270 --> 00:00:57,440
set ourselves up for a number of

25
00:01:01,110 --> 00:00:59,280
different experiments to learn different

26
00:01:02,389 --> 00:01:01,120
things and if something didn't work out

27
00:01:03,750 --> 00:01:02,399
that would be fine

28
00:01:06,469 --> 00:01:03,760
what are we looking at

29
00:01:07,910 --> 00:01:06,479
first experiment is looking at a

30
00:01:10,469 --> 00:01:07,920
investigated

31
00:01:12,469 --> 00:01:10,479
product we're looking at a new molecule

32
00:01:13,910 --> 00:01:12,479
that has some very interesting

33
00:01:16,710 --> 00:01:13,920
properties in

34
00:01:19,350 --> 00:01:16,720
a muscle wasting and it

35
00:01:21,429 --> 00:01:19,360
counters muscle wasting diseases so it's

36
00:01:23,109 --> 00:01:21,439
of interest to us and it's of interest

37
00:01:24,230 --> 00:01:23,119
to nasa

38
00:01:27,830 --> 00:01:24,240

the second

39
00:01:29,350 --> 00:01:27,840
experiment is looking at crystallization

40
00:01:31,590 --> 00:01:29,360
it's actually two sets of experiments

41
00:01:33,510 --> 00:01:31,600
the first is looking at co-crystallizing

42
00:01:35,590 --> 00:01:33,520
proteins of interest with molecules that

43
00:01:37,590 --> 00:01:35,600
we're working on to see how they fit

44
00:01:39,190 --> 00:01:37,600
together getting crystals of those and

45
00:01:41,270 --> 00:01:39,200
the other is looking at hard to

46
00:01:43,749 --> 00:01:41,280
crystallize proteins

47
00:01:47,190 --> 00:01:43,759
mostly self-surface proteins

48
00:01:49,749 --> 00:01:47,200
the third experiment is looking at

49
00:01:51,270 --> 00:01:49,759
freeze drying lawfulization sort the

50
00:01:52,630 --> 00:01:51,280
technical term

51
00:01:54,710 --> 00:01:52,640
but when you take a large batch of

52
00:01:56,870 --> 00:01:54,720
material and you freeze dry it it tends

53
00:01:58,550 --> 00:01:56,880
to layer out like a cake and those

54
00:02:00,550 --> 00:01:58,560
different layers represent different

55
00:02:03,510 --> 00:02:00,560
forms of the same material

56
00:02:04,950 --> 00:02:03,520
crystals or powders or

57
00:02:06,310 --> 00:02:04,960
and that's a bad thing for us because we

58
00:02:07,910 --> 00:02:06,320
want everything to be uniform especially

59
00:02:10,150 --> 00:02:07,920
if it's drug product so we want to

60
00:02:11,270 --> 00:02:10,160
understand where that layering is

61
00:02:14,070 --> 00:02:11,280
occurring is it happening when it

62
00:02:15,030 --> 00:02:14,080
freezes or is it happening when it gets

63
00:02:16,630 --> 00:02:15,040

dried

64
00:02:19,110 --> 00:02:16,640
so we're i'm actually going to make a

65
00:02:21,190 --> 00:02:19,120
big batch of material and we're going to

66
00:02:22,790 --> 00:02:21,200
freeze dry some of it on earth and then

67
00:02:24,550 --> 00:02:22,800
we're going to freeze dry some of it in

68
00:02:26,710 --> 00:02:24,560
space and then we're going to freeze

69
00:02:28,229 --> 00:02:26,720
some of it on earth and dry it in space

70
00:02:29,350 --> 00:02:28,239
and freeze some of it in space and dry

71
00:02:30,790 --> 00:02:29,360
it on earth

72
00:02:33,190 --> 00:02:30,800
and logistically that is the most

73
00:02:35,589 --> 00:02:33,200
difficult one because the last

74
00:02:37,270 --> 00:02:35,599
experiment where we freeze in space

75
00:02:39,589 --> 00:02:37,280
and then drop it out orbit and then

76
00:02:41,509 --> 00:02:39,599
bring it back we have to have a facility

77
00:02:43,589 --> 00:02:41,519
nearby that we can drive it to and dry

78
00:02:46,150 --> 00:02:43,599
it in while it's still frozen

79
00:02:48,710 --> 00:02:46,160
so wow so that's going to happen in san

80
00:02:50,949 --> 00:02:48,720
diego one of our sites in san diego

81
00:02:53,270 --> 00:02:50,959
and then the last experiment which was

82
00:02:54,070 --> 00:02:53,280
supposedly the easiest one to execute we

83
00:02:56,390 --> 00:02:54,080
thought

84
00:02:58,550 --> 00:02:56,400
the simplest is a mixing experiment

85
00:03:00,949 --> 00:02:58,560
we're taking a liquid a solid and a gas

86
00:03:03,750 --> 00:03:00,959
we're mixing them together

87
00:03:05,430 --> 00:03:03,760
when we take a mixture of material like

88
00:03:07,509 --> 00:03:05,440

that on earth

89
00:03:09,750 --> 00:03:07,519
we can watch how it dissolves and there

90
00:03:11,750 --> 00:03:09,760
tends to be an issue associated with how

91
00:03:13,750 --> 00:03:11,760
much material floats that has an impact

92
00:03:15,030 --> 00:03:13,760
on how well it dissolves or how fast it

93
00:03:16,790 --> 00:03:15,040
dissolves

94
00:03:18,229 --> 00:03:16,800
and that's called the float effect and

95
00:03:19,750 --> 00:03:18,239
we're trying to counter that by putting

96
00:03:20,790 --> 00:03:19,760
it in an environment where there is no

97
00:03:23,270 --> 00:03:20,800
float

98
00:03:25,030 --> 00:03:23,280
and see what the impact is

99
00:03:26,710 --> 00:03:25,040
that experiment we thought would be the

100
00:03:28,390 --> 00:03:26,720
easiest just mixing up a bunch of stuff

101
00:03:30,710 --> 00:03:28,400
but it is technically extremely

102
00:03:31,830 --> 00:03:30,720
challenging how do you measure it how do

103
00:03:33,270 --> 00:03:31,840
you get the liquid in there once

104
00:03:35,030 --> 00:03:33,280
everything else is in there how do you

105
00:03:38,470 --> 00:03:35,040
mix it consistently

106
00:03:40,789 --> 00:03:38,480
space isn't easy space is not easy no

107
00:03:43,030 --> 00:03:40,799
they're all designed to have some impact

108
00:03:44,710 --> 00:03:43,040
or lead to better understanding for us

109
00:03:46,309 --> 00:03:44,720
and how we do some of the things that

110
00:03:47,509 --> 00:03:46,319
you know are basic fundamental things

111
00:03:49,509 --> 00:03:47,519
that we do

112
00:03:51,670 --> 00:03:49,519
in our labs at the same time some of

113
00:03:53,830 --> 00:03:51,680

them are more specific to certain

114
00:03:55,509 --> 00:03:53,840
situations but again they're built to

115
00:03:57,509 --> 00:03:55,519
teach us something about

116
00:03:58,869 --> 00:03:57,519
what we think we know people who work at

117
00:04:01,190 --> 00:03:58,879
the company the people who are involved

118
00:04:03,429 --> 00:04:01,200
in a lot of these experiments or are

119
00:04:04,789 --> 00:04:03,439
scientists chemists biologists what have

120
00:04:07,429 --> 00:04:04,799
you

121
00:04:09,030 --> 00:04:07,439
but these efforts with nasa have really

122
00:04:11,750 --> 00:04:09,040
forced us to have conversations that

123
00:04:13,589 --> 00:04:11,760
many of us have not had since we were

124
00:04:15,509 --> 00:04:13,599
undergraduates you know about basic

125
00:04:16,870 --> 00:04:15,519
science or how we think things will

126
00:04:19,430 --> 00:04:16,880
happen

127
00:04:21,270 --> 00:04:19,440
and it's oftentimes

128
00:04:23,510 --> 00:04:21,280
the the most powerful experiments are

129
00:04:25,990 --> 00:04:23,520
the simple ones where you pretty much

130
00:04:27,990 --> 00:04:26,000
know what to expect and it doesn't

131
00:04:29,749 --> 00:04:28,000
happen that way right makes you