
NASA
SPACESTATION
LIVE

1
00:00:10,810 --> 00:00:07,929
space in the international space station

2
00:00:13,450 --> 00:00:10,820
offers researchers like me an

3
00:00:16,119 --> 00:00:13,460
opportunity to find the key variables to

4
00:00:18,480 --> 00:00:16,129
crystal growth my experiment is unique

5
00:00:21,400 --> 00:00:18,490
from other protein crystal growth

6
00:00:24,310 --> 00:00:21,410
experiments in that rather than getting

7
00:00:26,320 --> 00:00:24,320
large single crystals I'm interested in

8
00:00:28,350 --> 00:00:26,330
crystal and suspensions and these

9
00:00:32,530 --> 00:00:28,360
crystal and suspensions have

10
00:00:36,040 --> 00:00:32,540
applications such as manufacturing drug

11
00:00:38,860 --> 00:00:36,050
delivery formulation storage these are

12
00:00:42,850 --> 00:00:38,870
all problems of delivering these

13
00:00:44,740 --> 00:00:42,860

monoclonal antibody therapeutics one of

14
00:00:46,510 --> 00:00:44,750
the big problems with monoclonal

15
00:00:48,190 --> 00:00:46,520
antibodies even though they're very good

16
00:00:53,410 --> 00:00:48,200
drugs and they've been approved for

17
00:00:57,389 --> 00:00:53,420
cancer multiple sclerosis osteoporosis a

18
00:01:00,670 --> 00:00:57,399
number of serious life-threatening

19
00:01:04,270 --> 00:01:00,680
diseases is that they're very insoluble

20
00:01:05,920 --> 00:01:04,280
and so they're difficult to deliver one

21
00:01:08,590 --> 00:01:05,930
of the big problems is is that they

22
00:01:11,410 --> 00:01:08,600
usually have to be given as a constant

23
00:01:13,780 --> 00:01:11,420
infusion in a hospital setting over

24
00:01:17,440 --> 00:01:13,790
several hours and this impacts not only

25
00:01:19,750 --> 00:01:17,450
the patient but as a big impact on

26
00:01:21,430 --> 00:01:19,760
caregivers and we're hoping that we

27
00:01:23,920 --> 00:01:21,440
could come up with a crystal and

28
00:01:26,980 --> 00:01:23,930
suspension that you can take as a single

29
00:01:30,039 --> 00:01:26,990
injection in a doctor's office not only

30
00:01:33,100 --> 00:01:30,049
reducing the cost but but reducing the

31
00:01:36,820 --> 00:01:33,110
the time and pain and effort that a

32
00:01:39,940 --> 00:01:36,830
patient and caregivers have to do to

33
00:01:43,120 --> 00:01:39,950
deliver these products so where are we

34
00:01:45,730 --> 00:01:43,130
with that we on earth or in the process

35
00:01:47,560 --> 00:01:45,740
of making concentrated crystal and

36
00:01:50,200 --> 00:01:47,570
suspensions and we're hoping that

37
00:01:52,469 --> 00:01:50,210
microgravity because we get reduced

38
00:01:55,539 --> 00:01:52,479

sedimentation that we get reduced

39
00:01:57,730 --> 00:01:55,549
convection currents and reduce molecular

40
00:02:02,289 --> 00:01:57,740
motion that this will translate into

41
00:02:04,480 --> 00:02:02,299
larger pure more uniform suspensions and

42
00:02:06,160 --> 00:02:04,490
i want to emphasize uniform because for

43
00:02:09,210 --> 00:02:06,170
drug delivery it's very important that

44
00:02:13,110 --> 00:02:09,220
you have each individual particle

45
00:02:16,410 --> 00:02:13,120
has a predictable dissolution rate to

46
00:02:19,410 --> 00:02:16,420
make our drugs as effective as unsafe as

47
00:02:25,050 --> 00:02:19,420
possible our experiment has flown on

48
00:02:27,840 --> 00:02:25,060
SpaceX 3 as well as space X 6 from space

49
00:02:30,690 --> 00:02:27,850
x3 we're very happy to say that we got

50
00:02:33,060 --> 00:02:30,700
crystals that were larger in higher

51
00:02:35,490 --> 00:02:33,070
yield this was our proof of concept

52
00:02:38,730 --> 00:02:35,500
flight and we're very happy to see that

53
00:02:40,440 --> 00:02:38,740
this really mimicked the results that we

54
00:02:42,360 --> 00:02:40,450
had gotten from our earlier space

55
00:02:44,699 --> 00:02:42,370
shuttle missions and this was the

56
00:02:47,010 --> 00:02:44,709
predictable results we were hoping for

57
00:02:50,370 --> 00:02:47,020
and it gives us the confidence to go

58
00:02:52,650 --> 00:02:50,380
forward we just recently flown on SpaceX

59
00:02:54,600 --> 00:02:52,660
six and we got crystals back from that

60
00:02:57,150 --> 00:02:54,610
we're in the process of analyzing that

61
00:03:00,840 --> 00:02:57,160
and we're looking forward to SpaceX 9

62
00:03:03,390 --> 00:03:00,850
and SpaceX 9 we hope that we can finally

63
00:03:05,550 --> 00:03:03,400

make crystals and crystal and

64
00:03:08,850 --> 00:03:05,560
suspensions in the quantity that we need

65
00:03:11,310 --> 00:03:08,860
to do the analysis that we want to do to

66
00:03:14,240 --> 00:03:11,320
really figure out what are the key

67
00:03:16,979 --> 00:03:14,250
variables for making really high quality

68
00:03:20,130 --> 00:03:16,989
preparation suitable for pharmaceutical

69
00:03:22,830 --> 00:03:20,140
applications and I have to say that I

70
00:03:24,780 --> 00:03:22,840
guess surprises a lot of people because

71
00:03:26,009 --> 00:03:24,790
i never get exactly what i'm thinking

72
00:03:28,560 --> 00:03:26,019
i'm going to get from these experiments

73
00:03:30,720 --> 00:03:28,570
and I always learn from that I always

74
00:03:32,910 --> 00:03:30,730
tell people that I've learned how better

75
00:03:35,190 --> 00:03:32,920
to grow crystals on earth by growing in

76
00:03:37,350 --> 00:03:35,200
the microgravity because the focus of

77
00:03:41,100 --> 00:03:37,360
the efforts that I have to put in to

78
00:03:43,920 --> 00:03:41,110
make these experiments work forces me

79
00:03:45,870 --> 00:03:43,930
and forces our team to focus on the