



**SPACESTATION
LIVE**

1
00:00:09,160 --> 00:00:07,090
the International Space Station is used

2
00:00:11,320 --> 00:00:09,170
by all of the partners space agencies

3
00:00:13,450 --> 00:00:11,330
for scientific research that can't be

4
00:00:15,910 --> 00:00:13,460
done in an environment where gravity is

5
00:00:18,100 --> 00:00:15,920
dominant in the case of some medical

6
00:00:20,350 --> 00:00:18,110
experiments the weightlessness allows

7
00:00:22,270 --> 00:00:20,360
cells to behave in ways that help

8
00:00:24,940 --> 00:00:22,280
researchers learn about the nature of

9
00:00:26,230 --> 00:00:24,950
cancer cells which is information that

10
00:00:29,170 --> 00:00:26,240
can help in the fight against the

11
00:00:31,600 --> 00:00:29,180
disease one recent example of that is an

12
00:00:33,850 --> 00:00:31,610
experiment known as cell box thyroid

13
00:00:35,410 --> 00:00:33,860

cancer and to tell us about it we're

14

00:00:37,660 --> 00:00:35,420

joined this morning by the principal

15

00:00:39,940 --> 00:00:37,670

investigator dr. daniela grimm of the

16

00:00:42,490 --> 00:00:39,950

department of biomedicine pharmacology

17

00:00:45,640 --> 00:00:42,500

at our house university in denmark and

18

00:00:48,490 --> 00:00:45,650

her colleague dr. Marcus villain of the

19

00:00:50,800 --> 00:00:48,500

University of magdeburg dr. Grimm you

20

00:00:52,450 --> 00:00:50,810

had a previous study on the station in

21

00:00:55,780 --> 00:00:52,460

which you found that tumor cells behave

22

00:00:59,680 --> 00:00:55,790

a little less aggressively in space do

23

00:01:01,660 --> 00:00:59,690

we know yet why that is we use a fully

24

00:01:05,890 --> 00:01:01,670

differentiated thyroid cancer cell line

25

00:01:08,800 --> 00:01:05,900

which is a very aggressive two more this

26
00:01:12,000 --> 00:01:08,810
tumor cell line comes from a lymph node

27
00:01:15,760 --> 00:01:12,010
metastases from a 42 year old male and

28
00:01:19,060 --> 00:01:15,770
this experiment which we had on a

29
00:01:21,760 --> 00:01:19,070
spaceflight before cell box showed that

30
00:01:24,520 --> 00:01:21,770
these tener cancer cells produces a lot

31
00:01:27,670 --> 00:01:24,530
of genes and proteins which were

32
00:01:29,770 --> 00:01:27,680
regulated in a way that it seems to that

33
00:01:33,190 --> 00:01:29,780
they promote to shift to a less

34
00:01:35,740 --> 00:01:33,200
malignant form we don't know what is the

35
00:01:39,550 --> 00:01:35,750
reason for it because it was first time

36
00:01:43,350 --> 00:01:39,560
done and it was an empiric observation

37
00:01:46,420 --> 00:01:43,360
first but we have found that these cells

38
00:01:49,750 --> 00:01:46,430

grow three-dimensionally that means like

39

00:01:51,760 --> 00:01:49,760

a ball and these are round egg regards

40

00:01:54,300 --> 00:01:51,770

we call them so roads which are very

41

00:01:57,969 --> 00:01:54,310

similar to a metastasis in the blood or

42

00:02:01,749 --> 00:01:57,979

micro to muah they are nearer to the in

43

00:02:05,830 --> 00:02:01,759

vivo situation and the primary focus of

44

00:02:09,819 --> 00:02:05,840

the box was that we wanted to repeat the

45

00:02:12,640 --> 00:02:09,829

experiments and further elucidate the

46

00:02:13,230 --> 00:02:12,650

underlying mechanisms so that was with

47

00:02:15,710 --> 00:02:13,240

you

48

00:02:18,510 --> 00:02:15,720

to build on with this current experiment

49

00:02:21,600 --> 00:02:18,520

yeah this was the main purpose of the

50

00:02:24,060 --> 00:02:21,610

cbox experiment was to reproduce the

51
00:02:27,600 --> 00:02:24,070
results which we had obtained from the

52
00:02:30,210 --> 00:02:27,610
former space experiment and another

53
00:02:32,010 --> 00:02:30,220
important point is that observed effects

54
00:02:36,170 --> 00:02:32,020
we have to exclude that they are not

55
00:02:38,640 --> 00:02:36,180
artifact and we have to reproduce them

56
00:02:42,060 --> 00:02:38,650
one important point was that we wanted

57
00:02:45,600 --> 00:02:42,070
to focus on the proteins which may be

58
00:02:48,800 --> 00:02:45,610
involved in 3d close formation to which

59
00:02:51,480 --> 00:02:48,810
I involved in thyroid formation and

60
00:02:54,120 --> 00:02:51,490
during the side-box mission we have

61
00:02:56,220 --> 00:02:54,130
found interesting proteins which might

62
00:02:59,780 --> 00:02:56,230
play a role in the inhibition of this

63
00:03:03,540 --> 00:02:59,790

really grows and such proteins are

64

00:03:06,240 --> 00:03:03,550

related to a matrix around the cells it

65

00:03:08,250 --> 00:03:06,250

called extracellular matrix where a lot

66

00:03:12,750 --> 00:03:08,260

of signaling between the cells takes

67

00:03:15,720 --> 00:03:12,760

place and currently we are working on

68

00:03:18,360 --> 00:03:15,730

secreted proteins and have some interest

69

00:03:21,420 --> 00:03:18,370

interested data which we will publish in

70

00:03:23,670 --> 00:03:21,430

the near future your experiment flew to

71

00:03:27,270 --> 00:03:23,680

the station on a dragon cargo ship about

72

00:03:28,920 --> 00:03:27,280

18 months ago tell us about what samples

73

00:03:31,200 --> 00:03:28,930

it was that you use that you sent to

74

00:03:32,600 --> 00:03:31,210

space and what was done with them while

75

00:03:35,820 --> 00:03:32,610

they were there on the space station

76

00:03:39,630 --> 00:03:35,830

this was a cell line thyroid cancer cell

77

00:03:43,500 --> 00:03:39,640

encode FTC 133 which she studied in

78

00:03:46,920 --> 00:03:43,510

detail near the last ten years and it's

79

00:03:49,710 --> 00:03:46,930

well known in the scientific research

80

00:03:52,940 --> 00:03:49,720

area the cells were seated in the

81

00:03:57,780 --> 00:03:52,950

side-box containers and incubated for 37

82

00:04:00,690 --> 00:03:57,790

for 24 hours in 37 degrees and with

83

00:04:03,720 --> 00:04:00,700

fastest and co2 overnight on ground in

84

00:04:06,210 --> 00:04:03,730

the laboratory and the next day the hard

85

00:04:09,120 --> 00:04:06,220

way was checked by Airbus and the

86

00:04:13,410 --> 00:04:09,130

engineers then was to hand over to nana

87

00:04:15,930 --> 00:04:13,420

Rex and NASA nano Rex and NASA people

88

00:04:18,810 --> 00:04:15,940

transported the containers to the launch

89

00:04:22,050 --> 00:04:18,820

site and integrated the dragon

90

00:04:25,110 --> 00:04:22,060

integrated the samples in the Dragon

91

00:04:26,740 --> 00:04:25,120

spacecraft after their arrival on the

92

00:04:30,490 --> 00:04:26,750

ice as the hardware

93

00:04:33,190 --> 00:04:30,500

was installed in the NanoRacks facility

94

00:04:37,960 --> 00:04:33,200

where the cells were kept at 37 degrees

95

00:04:40,180 --> 00:04:37,970

and after 10 days the cells were fixed

96

00:04:44,530 --> 00:04:40,190

with a special fixative you call it on a

97

00:04:46,900 --> 00:04:44,540

later for later gene analysis in

98

00:04:50,760 --> 00:04:46,910

addition we collected the supernatant

99

00:04:53,980 --> 00:04:50,770

the medium and which was analyzed by

100

00:04:59,340 --> 00:04:53,990

United States company it's called movie

101
00:05:02,650 --> 00:04:59,350
at IBM in Austin in Texas yeah and after

102
00:05:06,340 --> 00:05:02,660
when we got everything back from from

103
00:05:08,470 --> 00:05:06,350
the dragon be analyzed the data and

104
00:05:10,900 --> 00:05:08,480
you've had the knack for for some time

105
00:05:12,970 --> 00:05:10,910
now is there is there anything that

106
00:05:17,920 --> 00:05:12,980
you've seen so far that is encouraging

107
00:05:20,680 --> 00:05:17,930
to you yes we have had identified

108
00:05:25,690 --> 00:05:20,690
proteins we have published this also in

109
00:05:28,000 --> 00:05:25,700
proteomics this year which are involved

110
00:05:30,880 --> 00:05:28,010
in the negative regulation of thyroid

111
00:05:34,090 --> 00:05:30,890
formation and in addition they have

112
00:05:38,520 --> 00:05:34,100
found a variety of biomolecules of

113
00:05:41,260 --> 00:05:38,530

secreted factors by the cells which were

114

00:05:44,650 --> 00:05:41,270

found in exerted elevations in space

115

00:05:47,680 --> 00:05:44,660

samples not on ground samples and many

116

00:05:50,350 --> 00:05:47,690

of these enzymes which were secreted are

117

00:05:52,570 --> 00:05:50,360

responsible to degrade these excess

118

00:05:56,710 --> 00:05:52,580

color matrix proteins what we have found

119

00:05:59,530 --> 00:05:56,720

also in the proteomic studying and this

120

00:06:02,070 --> 00:05:59,540

is what we do right now we publish these

121

00:06:05,200 --> 00:06:02,080

samples these data in the near future

122

00:06:07,060 --> 00:06:05,210

now it's most experiments on the space

123

00:06:09,580 --> 00:06:07,070

station involved collaboration from a

124

00:06:12,909 --> 00:06:09,590

lot of different entities dr. V Ion tell

125

00:06:15,370 --> 00:06:12,919

me about that what it took to get this

126

00:06:18,159 --> 00:06:15,380

particular experiment in together and

127

00:06:19,900 --> 00:06:18,169

then get it to orbit and get it back yes

128

00:06:22,870 --> 00:06:19,910

this was indeed a collaboration of many

129

00:06:25,930 --> 00:06:22,880

people involved and one of the most

130

00:06:28,900 --> 00:06:25,940

important roads where of course taken

131

00:06:31,000 --> 00:06:28,910

back at the drunk Space Agency dlr who

132

00:06:35,460 --> 00:06:31,010

offered us the opportunity to take part

133

00:06:38,380 --> 00:06:35,470

in this mission and day of course our

134

00:06:40,450 --> 00:06:38,390

collaborating with NASA and SpaceX so

135

00:06:45,460 --> 00:06:40,460

thank you to all those

136

00:06:48,640 --> 00:06:45,470

companies and institutions who offered

137

00:06:50,830 --> 00:06:48,650

us the opportunity then there was elbows

138

00:06:52,749 --> 00:06:50,840

defense in space who designed and

139

00:06:56,350 --> 00:06:52,759

constructed the cell culturing

140

00:06:57,999 --> 00:06:56,360

hardware's to our specifications space

141

00:07:00,640 --> 00:06:58,009

laboratories space life sciences

142

00:07:03,760 --> 00:07:00,650

laboratory is provided as a laboratory

143

00:07:06,249 --> 00:07:03,770

space in kc where we could prepare for

144

00:07:09,249 --> 00:07:06,259

both flight culture the sales and of

145

00:07:12,760 --> 00:07:09,259

course see the harbor where then nana

146

00:07:16,990 --> 00:07:12,770

legs of the infrastructure on board the

147

00:07:18,820 --> 00:07:17,000

ISS where all the sandbox happen could

148

00:07:22,089 --> 00:07:18,830

be housed and incubated at the right

149

00:07:24,310 --> 00:07:22,099

temperature and of course finally and

150

00:07:26,650 --> 00:07:24,320

last but not least we would also like to

151
00:07:30,070 --> 00:07:26,660
extend our thanks to our universities of

152
00:07:32,499 --> 00:07:30,080
our math book always supported our

153
00:07:35,260 --> 00:07:32,509
research dr. Grimm are you planning for

154
00:07:37,990 --> 00:07:35,270
for future experiments to try to follow

155
00:07:40,570 --> 00:07:38,000
up on what you've learned so far yes we

156
00:07:44,050 --> 00:07:40,580
have one space x8 the ESS were always

157
00:07:46,300 --> 00:07:44,060
project today they had a teleconference

158
00:07:49,060 --> 00:07:46,310
and we heard that the prospected launch

159
00:07:53,290 --> 00:07:49,070
date would be in January three early

160
00:07:56,680 --> 00:07:53,300
this next year on this mission we will

161
00:07:59,800 --> 00:07:56,690
have endothelial cells and we will focus

162
00:08:02,860 --> 00:07:59,810
on three dimensional growth and we will

163
00:08:06,100 --> 00:08:02,870

also see whether some growth factors can

164

00:08:08,589 --> 00:08:06,110

induce to formation the author will

165

00:08:12,580 --> 00:08:08,599

focus on several mechanisms of cell

166

00:08:16,360 --> 00:08:12,590

death and of differentiation and the

167

00:08:19,089 --> 00:08:16,370

salutation changes of these sounds dr.

168

00:08:21,219 --> 00:08:19,099

Graham gah dr. Wilander good luck with

169

00:08:25,060 --> 00:08:21,229

your work hope you have success as you

170

00:08:27,310 --> 00:08:25,070

continue dr. daniela grim of the is the

171

00:08:30,430 --> 00:08:27,320

principal investigator of the cell box