
BRIC Canister
P/N 1019-M-2100-00
S/N 002
B
A
5
BRIC Actuator Tool
NASA
SPACESTATION
LIVE

1
00:00:09,009 --> 00:00:07,119
plants growing in space have to cope

2
00:00:11,020 --> 00:00:09,019
with the physical realities of a

3
00:00:13,299 --> 00:00:11,030
microgravity environment where the lack

4
00:00:15,789 --> 00:00:13,309
of buoyancy driven convection can cause

5
00:00:17,890 --> 00:00:15,799
low oxygen conditions around the plant I

6
00:00:19,870 --> 00:00:17,900
spoke with one researcher who has grown

7
00:00:23,650 --> 00:00:19,880
plants on the space station inside a

8
00:00:25,090 --> 00:00:23,660
unique container what is brick it's not

9
00:00:27,880 --> 00:00:25,100
a brick like we think about on our house

10
00:00:31,030 --> 00:00:27,890
right though it's not brick means

11
00:00:33,760 --> 00:00:31,040
biological research in canister and it's

12
00:00:35,560 --> 00:00:33,770
a type of NASA hardware that's often

13
00:00:38,950 --> 00:00:35,570

been used to fly plants to the

14
00:00:41,650 --> 00:00:38,960
International Space Station there's five

15
00:00:45,160 --> 00:00:41,660
petri plates inside the shoe box sighs

16
00:00:47,740 --> 00:00:45,170
brick those petri plates are held in a

17
00:00:50,020 --> 00:00:47,750
petri dish fixation unit and the five

18
00:00:51,880 --> 00:00:50,030
petri plates also have a data logger

19
00:00:54,130 --> 00:00:51,890
which records the temperature inside the

20
00:00:56,110 --> 00:00:54,140
brick when you talk about growing plants

21
00:00:58,300 --> 00:00:56,120
in space this really excites people how

22
00:01:00,580 --> 00:00:58,310
did you get involved the growing lab is

23
00:01:02,970 --> 00:01:00,590
interested in studying plants responses

24
00:01:06,399 --> 00:01:02,980
to the environment and part of our

25
00:01:09,100 --> 00:01:06,409
expertise is looking at calcium changes

26
00:01:12,160 --> 00:01:09,110
in plant cells as they respond to

27
00:01:15,610 --> 00:01:12,170
different stresses so for example during

28
00:01:17,740 --> 00:01:15,620
low oxygen stress which is common on

29
00:01:20,050 --> 00:01:17,750
earth during flooding when flooding

30
00:01:22,750 --> 00:01:20,060
displaces the air spaces from the soil

31
00:01:26,110 --> 00:01:22,760
the roots experience low oxygen stress

32
00:01:28,510 --> 00:01:26,120
and this causes a lot of changes in gene

33
00:01:33,490 --> 00:01:28,520
expression and the ability for the plant

34
00:01:37,359 --> 00:01:33,500
to grow well so that naturally grew into

35
00:01:40,359 --> 00:01:37,369
the idea well if we can study plants on

36
00:01:42,969 --> 00:01:40,369
the space station in microgravity then

37
00:01:44,859 --> 00:01:42,979
there'll be some parallels to how plants

38
00:01:47,649 --> 00:01:44,869

are experiencing low oxygen stress on

39
00:01:49,210 --> 00:01:47,659
earth overall we've done a lot of these

40
00:01:50,890 --> 00:01:49,220
what have we learned what's the most

41
00:01:53,440 --> 00:01:50,900
important thing that we can take away so

42
00:01:55,570 --> 00:01:53,450
far after the plants are returned to

43
00:01:57,850 --> 00:01:55,580
earth we can study differences in gene

44
00:02:00,130 --> 00:01:57,860
expression so in addition to growing the

45
00:02:02,499 --> 00:02:00,140
plants on the space station we also grew

46
00:02:05,880 --> 00:02:02,509
plants at Kennedy Space Center on the

47
00:02:08,589 --> 00:02:05,890
earth to as a control so we can compare

48
00:02:10,839 --> 00:02:08,599
in parallel what's going on in the

49
00:02:13,629 --> 00:02:10,849
different environments and it turns out

50
00:02:14,110 --> 00:02:13,639
in space not only are the low oxygen

51
00:02:16,000 --> 00:02:14,120
stress

52
00:02:18,910 --> 00:02:16,010
genes upregulated like we had predicted

53
00:02:21,820 --> 00:02:18,920
but also a number of defense related

54
00:02:24,940 --> 00:02:21,830
genes including plant hormone signaling

55
00:02:28,390 --> 00:02:24,950
such as jasmonic acid and salicylic acid

56
00:02:31,270 --> 00:02:28,400
signaling genes are upregulated along

57
00:02:34,210 --> 00:02:31,280
with reactive oxygen species so all of

58
00:02:36,130 --> 00:02:34,220
these categories of genes indicate the

59
00:02:37,569 --> 00:02:36,140
plants are experiencing stress when

60
00:02:40,809 --> 00:02:37,579
they're in space flight but they're

61
00:02:42,640 --> 00:02:40,819
using the tools they have at hand the

62
00:02:44,530 --> 00:02:42,650
changes in gene expression to be able to