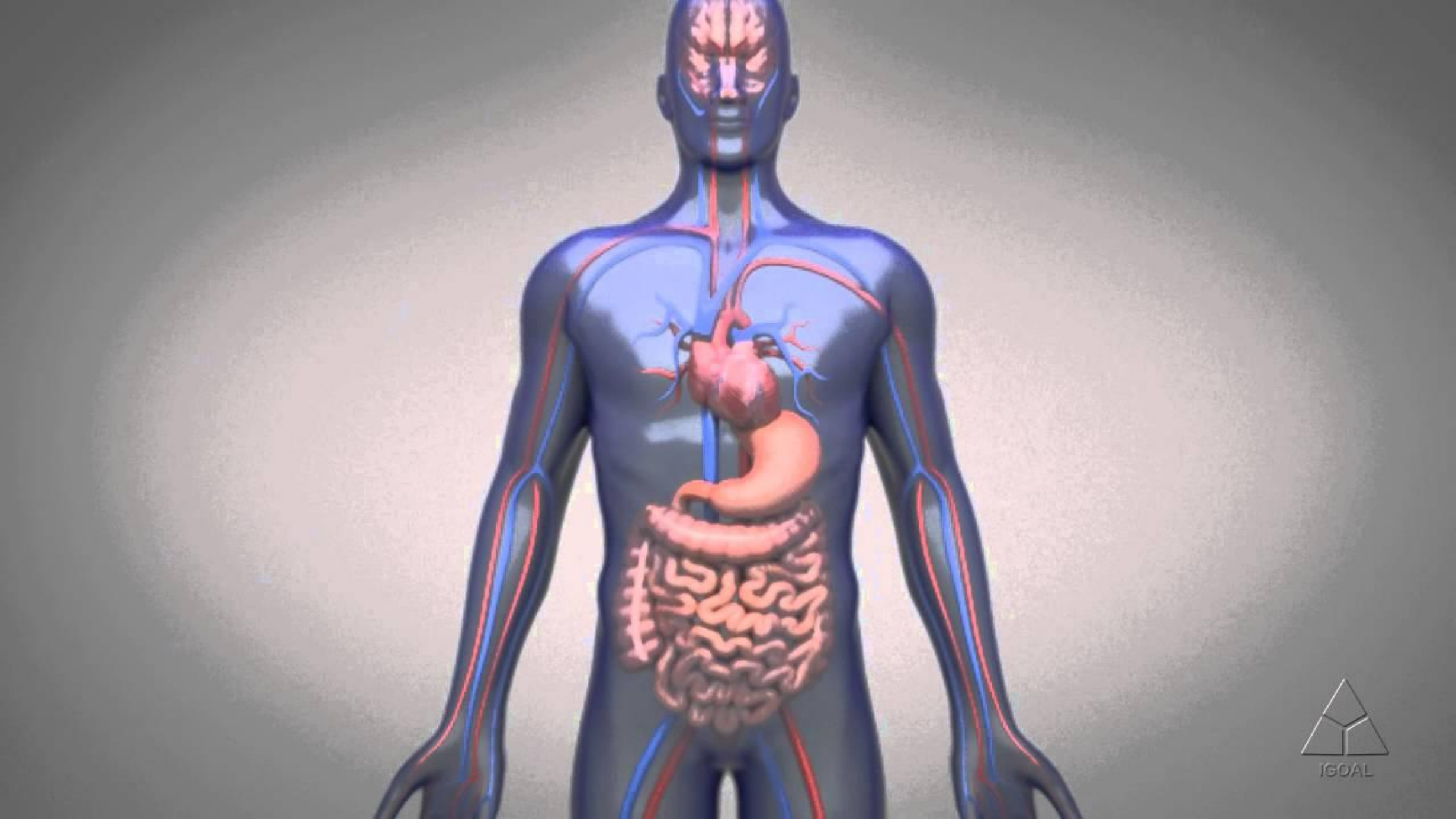
IGOAL

1
00:00:06,389 --> 00:00:04,070
in march of 2015 nasa embarked on a

2
00:00:08,150 --> 00:00:06,399
milestone mission in microgravity human

3
00:00:10,549 --> 00:00:08,160
research

4
00:00:12,789 --> 00:00:10,559
not only are astronauts scott kelly and

5
00:00:15,190 --> 00:00:12,799
cosmonaut mikhail korninko spending one

6
00:00:17,670 --> 00:00:15,200
year in space but both scott kelly and

7
00:00:19,990 --> 00:00:17,680
his identical twin back on earth mark

8
00:00:22,710 --> 00:00:20,000
are participating in a set of 10 focused

9
00:00:26,310 --> 00:00:22,720
investigations

10
00:00:28,390 --> 00:00:26,320
the space environment including

11
00:00:30,390 --> 00:00:28,400
microgravity radiation and other

12
00:00:32,470 --> 00:00:30,400
stressors affect the astronauts on a

13
00:00:34,470 --> 00:00:32,480

molecular level and how changes at this

14
00:00:36,150 --> 00:00:34,480
fundamental level may affect overall

15
00:00:38,150 --> 00:00:36,160
changes in astronaut health and

16
00:00:40,310 --> 00:00:38,160
well-being results from these

17
00:00:42,950 --> 00:00:40,320
investigations will allow us to better

18
00:00:45,990 --> 00:00:42,960
understand factors that influence aging

19
00:00:48,229 --> 00:00:46,000
cancer immune responses risk factors for

20
00:00:49,910 --> 00:00:48,239
diseases and treatments for those of us

21
00:00:51,910 --> 00:00:49,920
on earth

22
00:00:53,990 --> 00:00:51,920
many of these studies concentrate on the

23
00:00:55,750 --> 00:00:54,000
basic functions of our cells while

24
00:00:57,830 --> 00:00:55,760
others concentrate on how cellular

25
00:01:00,150 --> 00:00:57,840
changes correlate with physiology

26
00:01:02,069 --> 00:01:00,160
performance and behavior

27
00:01:04,229 --> 00:01:02,079
within the cell's nucleus lie the

28
00:01:06,230 --> 00:01:04,239
individual recipe books of our bodies

29
00:01:08,070 --> 00:01:06,240
chromosomes hold tightly packed strands

30
00:01:09,830 --> 00:01:08,080
of dna and are capped with a special

31
00:01:12,310 --> 00:01:09,840
repeated sequence of dna called a

32
00:01:15,429 --> 00:01:12,320
telomere the length of telomeres shorten

33
00:01:17,590 --> 00:01:15,439
as we age or are subjected to stress

34
00:01:19,830 --> 00:01:17,600
inside the chromosome reveals proteins

35
00:01:27,749 --> 00:01:19,840
called histones which are responsible

36
00:01:42,069 --> 00:01:30,390
rna is made from dna through a process

37
00:01:47,749 --> 00:01:44,069
proteins are made from rna through a

38
00:01:52,230 --> 00:01:49,749

proteins are essential in all living

39
00:01:54,469 --> 00:01:52,240
organisms and are involved in metabolism

40
00:01:57,429 --> 00:01:54,479
the structure of every cell and organ

41
00:02:00,950 --> 00:01:57,439
motion our senses the immune response

42
00:02:08,070 --> 00:02:02,950
this entire process affects other

43
00:02:11,910 --> 00:02:09,990
and urine samples are being collected to

44
00:02:13,750 --> 00:02:11,920
provide a database on biochemical

45
00:02:15,670 --> 00:02:13,760
changes that may occur as a result of

46
00:02:17,030 --> 00:02:15,680
the spaceflight environment

47
00:02:19,830 --> 00:02:17,040
scientists will not only look for

48
00:02:22,150 --> 00:02:19,840
changes but how they occur over time

49
00:02:23,990 --> 00:02:22,160
in space aspects of the immune system

50
00:02:26,229 --> 00:02:24,000
appear to be weakened which could lead

51
00:02:28,630 --> 00:02:26,239
to infections other aspects appear to be

52
00:02:30,710 --> 00:02:28,640
overactive which could cause allergy or

53
00:02:32,550 --> 00:02:30,720
hypersensitivity

54
00:02:34,390 --> 00:02:32,560
mark and scott's response to a flu

55
00:02:35,910 --> 00:02:34,400
vaccine will be studied in hopes of

56
00:02:38,070 --> 00:02:35,920
providing further clues to this

57
00:02:40,070 --> 00:02:38,080
phenomenon

58
00:02:41,910 --> 00:02:40,080
monitoring arterial structure will

59
00:02:44,470 --> 00:02:41,920
enable scientists to observe any

60
00:02:46,150 --> 00:02:44,480
macroscopic changes in blood vessels

61
00:02:48,070 --> 00:02:46,160
these will be compared to changes at the

62
00:02:50,470 --> 00:02:48,080
molecular level in order to reveal

63
00:02:52,710 --> 00:02:50,480

possible correlations

64
00:02:54,869 --> 00:02:52,720
fluid ships on orbit can affect

65
00:02:55,910 --> 00:02:54,879
intracranial pressure and cause visual

66
00:02:57,990 --> 00:02:55,920
impairment

67
00:02:59,750 --> 00:02:58,000
experiments are being run to discover if

68
00:03:02,710 --> 00:02:59,760
fluid ships might correlate with any

69
00:03:04,550 --> 00:03:02,720
molecular changes

70
00:03:05,949 --> 00:03:04,560
cognitive performance is crucial for

71
00:03:07,750 --> 00:03:05,959
mission success

72
00:03:09,670 --> 00:03:07,760
neuropsychological tests are being

73
00:03:11,990 --> 00:03:09,680
performed to compare how cognitive

74
00:03:13,589 --> 00:03:12,000
performance changes over time these

75
00:03:15,350 --> 00:03:13,599
changes will be compared to molecular

76
00:03:17,350 --> 00:03:15,360
markers in order to reveal possible

77
00:03:19,430 --> 00:03:17,360
correlations

78
00:03:22,869 --> 00:03:19,440
bacteria help us digest food and

79
00:03:25,030 --> 00:03:22,879
contribute to immune system function

80
00:03:27,430 --> 00:03:25,040
knowing how these microorganisms change

81
00:03:29,589 --> 00:03:27,440
over time in space can help us protect

82
00:03:37,190 --> 00:03:29,599
astronauts health on long-duration space

83
00:03:41,110 --> 00:03:38,949
data from all of these studies will be

84
00:03:43,110 --> 00:03:41,120
combined into one complete analysis in

85
00:03:45,030 --> 00:03:43,120
order to form a comprehensive picture of

86
00:03:46,470 --> 00:03:45,040
how the human body responds to space

87
00:03:48,390 --> 00:03:46,480
flight

88
00:03:50,309 --> 00:03:48,400

since the experiments are being run on

89
00:03:52,550 --> 00:03:50,319
only one set of twins

90
00:03:55,110 --> 00:03:52,560
definitive answers are not expected

91
00:03:56,949 --> 00:03:55,120
instead the comparison of this data will