
Millie Hughes Fulford
Principal Investigator, T-Cell Activation in Aging

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00:00:01,634 --> 00:00:03,469
>> The work that flight engineer
Mike Hopkins has been doing

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00:00:03,469 --> 00:00:07,606
today from the BP Reg
experiment is an example of some

3
00:00:07,606 --> 00:00:10,209
of the human life sciences
research that's underway

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00:00:10,209 --> 00:00:11,444
on orbit.

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00:00:11,444 --> 00:00:14,880
All of it is designed to
find out as much as possible

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00:00:14,880 --> 00:00:18,684
about how living in microgravity
affects the human body.

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00:00:18,684 --> 00:00:20,319
Now, that sort of
work has been going

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00:00:20,319 --> 00:00:22,955
on in space flight
for decades now.

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00:00:22,955 --> 00:00:26,292
This morning we have a report to
bring some perspective to that.

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00:00:26,292 --> 00:00:29,261
Here's Lori Meggs at the space
station's Payload Operations

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00:00:29,261 --> 00:00:31,897
Integration Center at the
Marshall Space Flight Center

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00:00:31,897 --> 00:00:33,866
in Huntsville, Alabama.

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00:00:33,866 --> 00:00:36,068
>> Dating back to Apollo
it's been documented

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00:00:36,068 --> 00:00:38,771
that astronauts' immune
systems become suppressed

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00:00:38,771 --> 00:00:40,139
in microgravity.

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00:00:40,139 --> 00:00:42,074
A study is looking
at why that happens.

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00:00:42,074 --> 00:00:44,677
It's called "T-Cell
Activation in Aging."

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00:00:44,677 --> 00:00:46,245
And the study's principal
investigator --

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00:00:46,245 --> 00:00:47,980
it's a personal cause for her --

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00:00:47,980 --> 00:00:51,150
Millie Hughes-Fulford
who flew aboard STS-40,

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00:00:51,150 --> 00:00:53,452
Space Lab's first
mission dedicated

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00:00:53,452 --> 00:00:55,654
to biomedical research.

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00:00:55,654 --> 00:00:59,225
>> We're looking at the
immunosuppression in astronauts.

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00:00:59,225 --> 00:01:03,395
We're using very complicated
bioinformatics in order to look

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00:01:03,395 --> 00:01:06,165
at all 30,000 genes involved.

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00:01:06,165 --> 00:01:10,970
And from there, we
are finding the way

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00:01:10,970 --> 00:01:14,006
to modulate the immune system.

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00:01:14,006 --> 00:01:17,376
Not only for people in
space flight but also

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00:01:17,376 --> 00:01:18,544
for people on the ground.

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00:01:18,544 --> 00:01:20,980
For instance, older people

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00:01:20,980 --> 00:01:24,984
as they age they have
an immunosuppression.

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00:01:24,984 --> 00:01:28,154
Something like 70%
of the people in ICU

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00:01:28,154 --> 00:01:30,156
that die have had pneumonia.

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00:01:30,156 --> 00:01:35,861
We're also looking at ways
to modulate the immune system

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00:01:35,861 --> 00:01:38,030
for autoimmune disease.

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00:01:38,030 --> 00:01:41,033
That would be when it's
turned on too high.

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00:01:41,033 --> 00:01:45,704
So, the hope for our research
is that we're going to be able

38
00:01:45,704 --> 00:01:48,774
to pinpoint the target areas

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00:01:48,774 --> 00:01:51,677
that might make a good
pharmaceutical target.

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00:01:51,677 --> 00:01:56,582
My experiment -- the first one
flew on station some time ago.

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00:01:56,582 --> 00:02:01,554
We published the paper
2012 about the experiment,

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00:02:01,554 --> 00:02:04,223
and this is the next
experiment following.

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00:02:04,223 --> 00:02:06,058

>> So, what did you
find in the first study?

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00:02:06,058 --> 00:02:07,860
>> In the first study
we found some

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00:02:07,860 --> 00:02:12,264
of the very early
signaling events that change

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00:02:12,264 --> 00:02:14,733
in the immune system
in microgravity.

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00:02:14,733 --> 00:02:17,603
In this study, we're
carrying it one step further.

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00:02:17,603 --> 00:02:22,508
We're able to look at
microRNA where we will be able

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00:02:22,508 --> 00:02:25,878
to have brand new
pharmaceutical targets.

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00:02:25,878 --> 00:02:27,179
>> Why does this
interest you, personally?

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00:02:27,179 --> 00:02:30,749
>> I'm interested in the
immune system because it's key

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00:02:30,749 --> 00:02:34,286
to health and it's
something that's very dramatic

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00:02:34,286 --> 00:02:37,923

in the astronauts and so
it's something easy to study.

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00:02:37,923 --> 00:02:42,661
Because in microgravity we have
removed a variable -- gravity.

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00:02:42,661 --> 00:02:46,932
And so, like any mathematical
problem that you take a variable

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00:02:46,932 --> 00:02:50,402
out many times you come
out with a new solution.

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00:02:50,402 --> 00:02:53,806
So, I'm using microgravity
as a tool to look

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00:02:53,806 --> 00:02:57,009
at how the immune system is
working and how the modulate is.

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00:02:57,009 --> 00:02:58,577
>> And that's why a
space station is ideal?

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00:02:58,577 --> 00:03:00,412
>> That's why a space
station is needed.

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00:03:00,412 --> 00:03:03,382
>> Tell me about your
personal experience

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00:03:03,382 --> 00:03:06,151
as a mission specialist
and how that has carried

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00:03:06,151 --> 00:03:08,120

over into the research
that you're interested in.

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00:03:08,120 --> 00:03:12,758
>> In 1991, I was a
crew member on STS-40.

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00:03:12,758 --> 00:03:14,960
We had 26 experiments.

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00:03:14,960 --> 00:03:18,130
And of those experiments
one of them was --

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00:03:18,130 --> 00:03:19,765
the PI was Augusto Cogoli

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00:03:19,765 --> 00:03:22,001
where he was looking
at the immune system.

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00:03:22,001 --> 00:03:23,369
I became very interested

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00:03:23,369 --> 00:03:27,940
in how the immune system was
working, got to know Augusto.

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00:03:27,940 --> 00:03:29,508
He called me later.

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00:03:29,508 --> 00:03:33,312
He knew I was working with
RNA and he wanted to know

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00:03:33,312 --> 00:03:34,580
if I'd collaborate with him.

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00:03:34,580 --> 00:03:37,216

And that's how we
started working together

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00:03:37,216 --> 00:03:38,450
on the immune system.

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00:03:38,450 --> 00:03:40,219
>> And that will
do it for us here

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00:03:40,219 --> 00:03:42,087
at the Payload Operations
Integration Center

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00:03:42,087 --> 00:03:43,255
in Huntsville.