WEBVTT

NOTE duration: ”00:03:07.989”

NOTE Confidence: 0.9876302

00:00:04.799 --> 00:00:05.859 Bone marrow microenvironment

NOTE Confidence: 0.99902344

00:00:06.160 --> 00:00:08.100 is an extremely sophisticated

NOTE Confidence: 0.87093097

00:00:08.559 --> 00:00:09.619 and highly coordinated

NOTE Confidence: 0.95405495

00:00:09.920 --> 00:00:12.179 niche for hematopoietic stem cells.

NOTE Confidence: 0.95405495

00:00:12.405 --> 00:00:13.684 There are multiple components of

NOTE Confidence: 0.95405495

00:00:13.684 --> 00:00:15.224 this. We have blood vessels.

NOTE Confidence: 0.95405495

00:00:15.285 --> 00:00:17.525 We have cardiovascular cells, stromal

NOTE Confidence: 0.95405495

00:00:17.525 --> 00:00:18.025 cells,

NOTE Confidence: 0.9987793

00:00:18.645 --> 00:00:19.465 fat cells,

NOTE Confidence: 0.97547495

00:00:19.845 --> 00:00:21.044 nerve cells, and and so

NOTE Confidence: 0.97547495

00:00:21.044 --> 00:00:22.564 many more. And all these

NOTE Confidence: 0.97547495

00:00:22.564 --> 00:00:23.064 components

NOTE Confidence: 0.9980469

00:00:23.525 --> 00:00:24.025 govern

NOTE Confidence: 0.939799

00:00:24.404 --> 00:00:26.564 and dictate the fate of

NOTE Confidence: 0.939799

00:00:26.564 --> 00:00:27.870 an hematopoietic stem

NOTE Confidence: 0.9838867

00:00:30.350 --> 00:00:30.850 cell.

NOTE Confidence: 0.9917214

00:00:31.550 --> 00:00:33.470 Hematopoietic stem cells have the

NOTE Confidence: 0.9917214

00:00:33.470 --> 00:00:35.890 potential to create and regenerate

NOTE Confidence: 0.9917214

00:00:35.950 --> 00:00:36.830 all the blood cells in

NOTE Confidence: 0.9917214

00:00:36.830 --> 00:00:38.670 our body. My lab works

NOTE Confidence: 0.9917214

00:00:38.670 --> 00:00:39.890 on specialized

NOTE Confidence: 0.89404297

00:00:40.270 --> 00:00:41.330 bone marrow micro

NOTE Confidence: 0.92136234

00:00:42.725 --> 00:00:44.645 which govern these hematopoic stem

NOTE Confidence: 0.92136234

00:00:44.645 --> 00:00:46.725 cells in different cranial facial

NOTE Confidence: 0.92136234

00:00:46.725 --> 00:00:47.945 bones in our head.

NOTE Confidence: 0.9577637

00:00:48.485 --> 00:00:49.845 So before I started my

NOTE Confidence: 0.9577637

00:00:49.845 --> 00:00:50.345 lab,

NOTE Confidence: 0.9196167

00:00:50.725 --> 00:00:52.485 I discovered that the skull

NOTE Confidence: 0.9196167

00:00:52.485 --> 00:00:54.165 bone marrow micro environment is

NOTE Confidence: 0.9196167

00:00:54.165 --> 00:00:54.810 very different

NOTE Confidence: 0.9626628

00:00:55.210 --> 00:00:56.590 from other bone marrow compartments.

NOTE Confidence: 0.9916667

00:00:57.450 --> 00:00:58.570 But there are twenty three

NOTE Confidence: 0.9916667

00:00:58.570 --> 00:01:00.090 different cranial facial bones in

NOTE Confidence: 0.9916667

00:01:00.090 --> 00:01:02.030 our head. So my lab

NOTE Confidence: 0.99736327

00:01:02.570 --> 00:01:04.010 is trying to find out

NOTE Confidence: 0.99736327

00:01:04.010 --> 00:01:06.350 how functionally unique and specialized

NOTE Confidence: 0.9831543

00:01:06.810 --> 00:01:07.950 these bone marrow microenvironments

NOTE Confidence: 0.97700554

00:01:08.250 --> 00:01:09.575 are. And we're trying to

NOTE Confidence: 0.97700554

00:01:09.575 --> 00:01:11.175 figure out ultimately figure out

NOTE Confidence: 0.97700554

00:01:11.175 --> 00:01:12.935 why we have cranial facial

NOTE Confidence: 0.97700554

00:01:12.935 --> 00:01:14.375 bone marrow and why we

NOTE Confidence: 0.97700554

00:01:14.375 --> 00:01:15.335 need to have so many

NOTE Confidence: 0.97700554

00:01:15.335 --> 00:01:15.915 of them.

NOTE Confidence: 0.9871455

00:01:16.855 --> 00:01:18.455 As you know, we have

NOTE Confidence: 0.9871455

00:01:18.455 --> 00:01:20.215 severe bone loss during aging.

NOTE Confidence: 0.9871455

00:01:20.215 --> 00:01:21.175 But it's not only the

NOTE Confidence: 0.9871455

00:01:21.175 --> 00:01:22.775 bone that ages, the bone

NOTE Confidence: 0.9871455

00:01:22.775 --> 00:01:23.995 marrow also ages.

NOTE Confidence: 0.9980469

00:01:24.420 --> 00:01:24.920 We

NOTE Confidence: 0.9831543

00:01:25.380 --> 00:01:26.819 lose blood vessels in the

NOTE Confidence: 0.9831543

00:01:26.819 --> 00:01:28.260 bone marrow as we age.

NOTE Confidence: 0.9831543

00:01:28.260 --> 00:01:30.100 There's an excessive accumulation of

NOTE Confidence: 0.9831543

00:01:30.100 --> 00:01:32.280 fat cells, which directly inhibit

NOTE Confidence: 0.9263867

00:01:32.580 --> 00:01:34.680 normal hematopoic stem cell activity,

NOTE Confidence: 0.99820966

00:01:35.060 --> 00:01:37.140 and the environment becomes very

NOTE Confidence: 0.99820966

00:01:37.140 --> 00:01:37.640 inflammatory

NOTE Confidence: 0.9078369

00:01:38.180 --> 00:01:39.000 during aging.

NOTE Confidence: 0.9739014

00:01:40.465 --> 00:01:41.665 Most of these studies have

NOTE Confidence: 0.9739014

00:01:41.665 --> 00:01:43.265 been done in long bones

NOTE Confidence: 0.9739014

00:01:43.265 --> 00:01:44.485 in our arms and legs.

NOTE Confidence: 0.9739014

00:01:44.545 --> 00:01:46.385 And I found that the

NOTE Confidence: 0.9739014

00:01:46.385 --> 00:01:48.465 skull bone marrow is actually

NOTE Confidence: 0.9739014

00:01:48.465 --> 00:01:49.925 going in the opposite direction.

NOTE Confidence: 0.9208374

00:01:50.385 --> 00:01:52.225 It's actually growing and staying

NOTE Confidence: 0.9208374

00:01:52.225 --> 00:01:53.525 healthy in function.

NOTE Confidence: 0.93957204

00:01:56.810 --> 00:01:58.810 We're using innovative imaging methods

NOTE Confidence: 0.93957204

00:01:58.810 --> 00:02:00.330 like in vivo labeling with

NOTE Confidence: 0.93957204

00:02:00.330 --> 00:02:01.870 fluorescence conjugated antibodies

NOTE Confidence: 0.9921875

00:02:02.330 --> 00:02:02.830 to

NOTE Confidence: 0.98817277

00:02:03.210 --> 00:02:05.050 image these different cranial facial

NOTE Confidence: 0.98817277

00:02:05.050 --> 00:02:06.270 bones in its entirety.

NOTE Confidence: 0.9694336

00:02:06.890 --> 00:02:08.910 And we're using skull transplantation

NOTE Confidence: 0.9980469

00:02:09.610 --> 00:02:10.215 to assess

NOTE Confidence: 0.9975586

00:02:10.614 --> 00:02:11.834 specialized contribution

NOTE Confidence: 0.98583984

00:02:12.135 --> 00:02:14.155 from different cranial facial bones.

NOTE Confidence: 0.97861326

00:02:14.455 --> 00:02:16.555 We're also using intravital imaging

NOTE Confidence: 0.9737142

00:02:16.935 --> 00:02:18.635 to track tissue morphogenesis,

NOTE Confidence: 0.99438477

00:02:19.334 --> 00:02:21.095 and we're using also very

NOTE Confidence: 0.99438477

00:02:21.095 --> 00:02:23.275 creative methods of partial irradiation

NOTE Confidence: 0.98945314

00:02:23.735 --> 00:02:25.260 to assess their hematopoiet

NOTE Confidence: 0.9674072

00:02:25.880 --> 00:02:27.419 contribution to systemic circulation.

NOTE Confidence: 0.9777251

00:02:31.080 --> 00:02:32.520 Now we know that the

NOTE Confidence: 0.9777251

00:02:32.520 --> 00:02:34.300 skull bone marrow is continuously

NOTE Confidence: 0.9777251

00:02:34.520 --> 00:02:36.375 in communication with what's happening

NOTE Confidence: 0.9777251

00:02:36.455 --> 00:02:37.895 in the CNS in our

NOTE Confidence: 0.9777251

00:02:37.895 --> 00:02:38.395 brain.

NOTE Confidence: 0.98339844

00:02:39.095 --> 00:02:41.175 We don't know yet which

NOTE Confidence: 0.98339844

00:02:41.175 --> 00:02:43.355 bone marrow microenvironments are contributing

NOTE Confidence: 0.89415145

00:02:43.975 --> 00:02:45.035 to the neuroinflammation

NOTE Confidence: 0.9633789

00:02:45.575 --> 00:02:46.075 and

NOTE Confidence: 0.99008787

00:02:46.375 --> 00:02:47.435 subsequent neurodegeneration.

NOTE Confidence: 0.95870185

00:02:49.019 --> 00:02:51.500 So we're hoping to find

NOTE Confidence: 0.95870185

00:02:51.500 --> 00:02:53.819 novel therapeutic targets within cranial,

NOTE Confidence: 0.95870185

00:02:53.819 --> 00:02:55.419 facial, bone marrow that we

NOTE Confidence: 0.95870185

00:02:55.419 --> 00:02:56.639 could employ

NOTE Confidence: 0.95528156

00:02:57.180 --> 00:02:58.480 to treat neurodegenerative

NOTE Confidence: 0.91875

00:02:58.780 --> 00:03:00.799 diseases like Alzheimer's or neuroinflammatory

NOTE Confidence: 0.989624

00:03:01.099 --> 00:03:02.879 diseases like multiple sclerosis.