WEBVTT

00:00:05.922 --> 00:00:08.425 Typically DNA is on linear strands.

00:00:08.425 --> 00:00:10.176 So you have 46 chromosomes.

00:00:10.176 --> 00:00:13.179 Each of those 46 chromosomes is a linear strand of DNA.

00:00:13.513 --> 00:00:14.973 However, in some cancer cells,

00:00:14.973 --> 00:00:18.101 what we found is that there are small pieces of circular DNA,

00:00:18.560 --> 00:00:23.940 and these are called extra chromosomal circular DNA amplification, or ecDNA in short.

00:00:23.982 --> 00:00:29.446 The presence of DNA enables cancer cells such as glioblastoma cells or brain cancer cells

00:00:29.446 --> 00:00:32.949 to adjust to challenges in their microenvironment.

00:00:33.116 --> 00:00:36.703 For example, the presence of ecDNA enables those cancer cells

00:00:36.703 --> 00:00:41.166 to deal with the toxic effects of radiation therapy or chemotherapy

00:00:41.166 --> 00:00:43.251 or any other therapy for that matter.

00:00:49.424 --> 00:00:50.717 Our lab is a brain cancer lab.

00:00:50.717 --> 00:00:53.344 We are dedicated to developing therapies

00:00:53.344 --> 00:00:55.847 to better treat glioblastoma and glioma patients.

00:00:56.806 --> 00:00:59.350 Glioblastoma is a grade four brain tumor.

00:00:59.350 --> 00:01:02.520 It's the most common malignant brain tumor in adult patients.

00:01:02.729 --> 00:01:04.230 It's a devastating tumor type.

00:01:04.230 --> 00:01:06.733 Patients that are diagnosed with this kind of cancer

00:01:06.733 --> 00:01:09.569 often have a very short lifespan following diagnosis.

00:01:09.569 --> 00:01:11.821 This is a tumor type that really has not seen any

00:01:11.821 --> 00:01:14.783 progress in clinical treatments in the past 30-40 years

00:01:14.783 --> 00:01:16.785 and we are very motivated to change that.

00:01:23.625 --> 00:01:26.503 My lab has traditionally done a lot of profiling,

00:01:26.503 --> 00:01:29.339 which means that we take a tumor sample from a patient

00:01:29.339 --> 00:01:31.800 and generate lots of data from this single tumor,

00:01:31.800 --> 00:01:33.218 sometimes billions of data points,

00:01:33.802 --> 00:01:36.429 and then we use computational data science approaches

00:01:36.429 --> 00:01:38.098 to make sense of those data sets.

00:01:39.432 --> 00:01:43.019 Now we are in a phase where we're trying to take what we've learned

00:01:43.478 --> 00:01:45.897 and do functional experiments,

00:01:45.897 --> 00:01:50.235 where we can test hypotheses that are derived from our data science analysis

00:01:50.235 --> 00:01:52.821 and turn those into targets

00:01:52.946 --> 00:01:56.699 and once we have targets, which is a stage where we are now, we have targets

00:01:56.783 --> 00:01:58.076 we want to turn that into,

00:01:58.076 --> 00:02:01.371 can we now develop small molecules or other treatment modalities

00:02:01.621 --> 00:02:03.081 that aim for those targets.

00:02:08.837 --> 00:02:12.423 Anybody who has had cancer or who knows somebody that has been treated for cancer,

00:02:12.423 --> 00:02:15.802 knows that the side effects are often very challenging

00:02:15.802 --> 00:02:20.306 and sometimes lead the patient to no longer be able to take a certain therapy.

00:02:20.348 --> 00:02:23.351 For example, many chemotherapies are so toxic,

00:02:23.351 --> 00:02:26.354 the patient gets so sick that treatment has to be discontinued.

00:02:26.354 --> 00:02:30.817 So targeted therapy is a way to treat patients with very high efficiency.

00:02:30.859 --> 00:02:33.236 You're really trying to only hit the cancer cells

00:02:33.236 --> 00:02:35.822 and leave the other cells in your body alone,

00:02:35.822 --> 00:02:38.449 and thereby minimizing all those toxic side effects.

00:02:38.992 --> 00:02:42.245 Our strong motivation is to develop these molecules,

00:02:42.245 --> 00:02:43.955 make them safe to use in humans,

00:02:43.955 --> 00:02:47.458 and then put them into phase zero, one, two, or three trials,

00:02:47.458 --> 00:02:49.043 and ultimately approval by the FDA.

00:02:50.587 --> 00:02:52.964 I work closely with radiation neuro-oncolology

00:02:52.964 --> 00:02:55.425 and neurosurgery and pathology and radiology.

00:02:56.050 --> 00:02:59.721 Glioblastoma is disease that no individual is ever going to a cure.

00:02:59.721 --> 00:03:02.056 This really has to come from collaboration,

00:03:02.056 --> 00:03:04.934 open science, to together do better for these patients.