You’ve heard that good control of your blood glucose can lower your risk of complications such as kidney disease. You may have also heard that there are inherited factors—genes—that influence who gets kidney disease and who doesn’t.

Scientists suspect genes play a role in both diabetes and kidney disease because these diseases run in families.

Johanna Wolford, PhD, of the Translational Genomics Research Institute, wants to identify genes that make some people with diabetes more susceptible to kidney disease.
than others. To do this, she is studying the Pima Indians of Arizona. Both diabetes and kidney disease are common in this community of 7,000 people southeast of Phoenix.

Wolford expects that the same genes that lead to diabetic kidney disease in the Pimas may lead to diabetic kidney disease in the general population.

Her research might lead to a diagnostic test to tell people whether they’re likely to get diabetic kidney disease, much like the current tests for genes involved in breast cancer.

Wolford would also like to see these genes used to develop better drugs to treat kidney disease in people with type 1 or type 2 diabetes.

“The ultimate goal of my research is to prevent and eradicate nephropathy [kidney disease],” says Wolford.

The Pima Indians Of The Gila River

The Pimas are no strangers to diabetes research. It was studies on the Pima Indians in the 1960s and 1970s that helped scientists make the connection between obesity and type 2 diabetes.

Why the Pimas? They have high rates of diabetes and obesity: Half of all Pimas have diabetes, and of those with diabetes,
nearly all are overweight. They also have a tight-knit community: Members often marry one another and stay in the same place throughout their lives.

The combination of these things makes it easier for scientists to study genes passed down through generations to cause complicated diseases such as diabetes.

**Gene Chips**

What made scientists study the Pimas 30 years ago holds true today, for researchers like Wolford. Yet Wolford is using cutting-edge technology at the Translational Genomics Research Institute to ramp up the hunt for genes.

Wolford and her colleagues are studying 257 Pima families—parents and their children. The 257 families are separated into two groups: those with diabetic kidney disease and those without.

As a control, they are also studying a separate group of 200 people with diabetes who aren’t related to one another. Some of these people have kidney disease while others do not.

For the study, clinicians at the Gila River Indian Community clinic collect blood samples from individuals who have agreed to participate in the research, usually during an annual exam. Later, scientists extract DNA (a person’s genetic information) from the blood sample, which is then cataloged and used for the study.

Next, Wolford uses a small, sophisticated device called a “gene chip” to closely look at each individual DNA sample. The gene chip gives a detailed picture of the differences between one person’s DNA and the next.

She’s looking for similar patterns in the DNA of individuals in families with diabetic kidney disease, in comparison to the DNA of individuals in families without diabetic kidney disease.

Wolford is also looking for patterns in the DNA of people with and without end-stage renal disease.

These patterns could flag something in the DNA that causes kidney disease.

In previous studies of the Pimas, Wolford found similar patterns in stretches of DNA on chromosomes 3 and 7 (humans have 46 chromosomes) in those with kidney disease.

Later studies showed that these DNA patterns are not unique to the Pima Indians. They were found in a variety of people with type 1 or type 2 diabetes and kidney disease.

**Zeroing In**

Now, Wolford is zeroing in on these stretches of DNA to pinpoint specific genes that may make these people susceptible to kidney disease. For example, someone might have a version of a gene that makes the body produce more of a certain protein, which could then lead to disease.

Wolford says she’s excited because she has already found one gene associated with kidney disease. And she is working with other scientists to see if this gene also causes kidney disease in different populations of people.

She suspects that the genes she identifies won’t be unique to the Pimas. It will likely be a genetic finding that can be applied to others with diabetes and kidney disease.

“The epidemiology and progression of kidney disease is similar in type 1 and type 2 diabetes,” Wolford says. She speculates that the genetic underpinnings of the disease are not going to be that different.

**Biotech In Arizona**

Wolford says the most surprising aspect of her research is the support and enthusiasm of the people of Arizona.

“Diabetes is a big problem in this part of the country,” she says. “And people really want to participate in our work.” She says that giving back to the community is a critical aspect of her work. “It’s important that the work I’m doing could help my neighbors.”