Currently, around 10,000 Australians are undergoing dialysis therapy. Kidney failure accounts for 11 per cent of deaths in Australia each year. One in three Australians are at risk of kidney disease.

DR KAREN DWYER

A LITTLE THING CALLED CD39

Dr Karen Dwyer is a nephrologist and researcher at St. Vincent's.

"Transplantation is my passion," she says. "I'd love for transplantation to be a routine treatment but at the moment it is very select and only a minority of patients actually receive a kidney. I've watched people die waiting for a transplant."

Dr Dwyer looks forward to the day when xenotransplantation – the transplantation of organs from animals such as pigs – becomes a clinical reality. The greatest barrier to this, she explains, is rejection, a factor still causing significant issues for human-to-human transplants.

Her research focuses on the protective qualities of a molecule known as CD39 and whether it can reduce the likelihood of rejection. CD39 is related to clotting and the immune system. It has a regulatory role and science is only beginning to explore its impact on a range of conditions.

"The powerful anti-rejection drugs currently used for transplant recipients have serious side effects. There is an increased risk of cancer, cardiovascular disease and other illnesses.

"If we can reduce the drug burden, we can improve the quality and quantity of life for transplant recipients. Hopefully CD39 can help achieve this," she explains.

Dr Dwyer's interest in CD39 stems from her PhD which involved collaboration with world-leading researchers in Boston. "We discovered that CD39 works with a particular immune cell that regulates T-Cells and this link is very important."

She now oversees a team of research assistants, PhD students and post doctorates at St. Vincent's. Her work is spread across three areas related to transplantation – protecting the longevity of transplanted islet cells, minimising the damage caused to organs by cutting off and reconnecting the blood supply during transplantation (ischaemia reperfusion injury) and understanding pre-eclampsia (a condition that occurs during pregnancy when the mother's immune system identifies the foetus as foreign).

The pre-eclampsia research, conducted in partnership with the Royal Women's Hospital, may seem an unusual area of study for a nephrologist but Dr Dwyer explains:

"Pregnancy is similar in a way to organ transplantation because half of the baby's DNA is not from the mother. In the majority of cases, the mother doesn't reject the foetus. Why is that? What can it teach us about organ rejection?"

The other two projects see her working closely with fellow researchers at St. Vincent's as well as the Walter and Eliza Hall Institute and Westmead Hospital in Sydney.

Her energy is impressive – Dr Dwyer manages to combine a heavy research schedule and clinical workload with a daily commute from Geelong and three children under the age of five.

Maintaining contact with patients through her work at St. Vincent's dialysis centre keeps Dr Dwyer motivated.

"It puts everything into perspective and makes sure you're focusing on meeting the most pressing needs and creating solutions that can have a real impact."