Across Africa, the need for improved tuberculosis diagnosis and treatment is growing.

BIOMEDICAL RESEARCH

Foundation opens TB lab in Africa

Howard Hughes Medical Institute sets up shop at ground zero for tuberculosis: South Africa's KwaZulu-Natal.

BY LINDA NORDLING IN DURBAN

Patients huddle in dressing gowns outside the entrance to the King George V Hospital in Durban, South Africa. It is safer out here: fresh air limits the spread of disease. Inside, the sickest lie listless, too tired to get up, or perhaps beyond caring.

This threadbare hospital is on the front line in Durban's war against multidrug-resistant and extensively drug-resistant tuberculosis (TB). Its patients — most of whom also have HIV — undergo gruelling courses of treatment that last for months or years. Those who get better may experience side effects such as hearing loss or psychosis. The unlucky ones die.

For William Bishai, these bleak circumstances offer a source of hope, through an unusual research collaboration. The microbiologist heads the KwaZulu-Natal Research Institute for Tuberculosis and HIV (K-RITH), which officially opens on 9 October in a new building on the campus of the Nelson R. Mandela School of Medicine at the University of KwaZulu-Natal (UKZN) in Durban.

The province of KwaZulu-Natal has one of the highest rates of TB cases in the world: about

3,000 drug-resistant cases are diagnosed each year. Furthermore, 80% of people diagnosed with TB there also have HIV — making the province perhaps the best place in the world to study the lethal interplay between these diseases. The dire need, and the opportunity to develop new treatments and diagnostics, led the Howard Hughes Medical Institute (HHMI) in Chevy Chase, Maryland — one of the richest biomedical research foundations in the world — to establish K-RITH as its first laboratory outside the United States. The HHMI will spend about US\$75 million on the institute over 10 years; the UKZN will contribute another \$10 million.

The seven-storey, \$40-million K-RITH building is close to Durban's main chest clinic, where 15,000 people are screened for TB, HIV and other sexually transmitted diseases every month. This is where people will be recruited to take part in research. "The samples are literally just outside our door," says Bishai.

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Antibiotics that successfully treat TB have been around since the 1940s, but interrupted or

incomplete courses of treatment using first-line drugs such as isoniazid and rifampicin have led to an alarming worldwide increase in infections with resistant strains of TB (T. Dalton *et al.* *Lancet* <http://doi.org/h8r>; 2012). K-RITH will focus on developing better treatments and faster and more accurate diagnostic tests, not only to improve survival, but also to reduce the spread of the disease. In addition, the institute will study the relationship between TB and HIV, which Bishai says is poorly understood. "It is clear that TB makes HIV worse and HIV makes TB worse. But we don't understand the mechanism behind this," he says.

The institute is part of a growing trend in Africa to locate research on diseases close to the people who have them, says Bishai. Samples collected in Africa were once sent to the United States, Europe or Asia for study, but this often leaves local scientists and patients feeling exploited. Co-location of research and patients helps to build scientific capacity in the region, and encourage locals to participate in studies.

Eight investigators already work at K-RITH, and three are African. "We really beat the bushes to find African scientists," says Bishai, who moved from Maryland to Durban last year. Ugandan engineer Frederick Balagaddé will use microfluidic chips — chemistry sets the size of credit cards — to develop improved tests for HIV and TB. Adrie Steyn, a South African microbiologist, will study how *Mycobacterium tuberculosis*, the microbe that causes TB, fends off attacks by the immune system. And Thumbi Ndung'u, a Kenyan virologist, wants to find out why some people are less susceptible to HIV infection than others.

The other investigators are European or from the United States, but all had to agree to spend at least 80% of their time in Durban. One is a legend of TB research: Frenchman Jacques Grosset was diagnosed with TB at the age of 25, and after getting out of the sanatorium he took up the fight against the disease at the Pasteur Institute in Paris. Over the past 50 years he has had a hand in developing most of the drug regimens used to treat TB. Now, at the age of 83, Grosset has moved from Paris to Durban, expecting to finish his long and illustrious career using K-RITH's biocontainment laboratories to study drug-resistant TB in mice.

K-RITH's first clinical study is already under way, and aims to work out the optimum dose of TB drugs to use in children who have both TB and HIV. Another begins recruiting this month, as part of a global trial of a combination of drugs — PA-824, moxifloxacin and pyrazinamide — sponsored by the Global Alliance for TB Drug Development, a public-private partnership in New York (see *Nature* **487**, 413–414; 2012).

Having this hive of research activity on their doorstep is already raising the hopes of local clinicians, says Surie Chinappa, a doctor at the Durban chest clinic. "I think it will be positive for our patients." ■