To fulfil its vision of becoming a world-wide centre of excellence in clinical, biomedical, experimental and translational research, KAIMRC has created a sophisticated infrastructure for its scientists and investigators to pursue their research.

With the recent opening of its new facilities across the Kingdom of Saudi Arabia, KAIMRC is now spread across several locations. Each of these new facilities boasts state-of-the-art equipment and technologies.

The new KAIMRC building in Riyadh covers 35,000 m², and includes various laboratories and lecture rooms. The two other sites – a 10,000 m² building in Jeddah and a 5,000 m² building in Al-Ahsa – are similarly well equipped. Located at two different regions of the Kingdom, each site will focus on a different set of health challenges to address the needs of the people.

Along with the expansion across the country, the facilities are also frequently upgraded to meet KAIMRC’s growth needs. Researchers at the Saudi Biobank aim to collect tissue samples from 200,000 Saudi individuals. To do this, they recently launched a fully-automated DNA banking system that uses robots to extract DNA from blood samples to accelerate the identification of disease-causing mutations and the development of effective treatments.

KAIMRC is currently expanding this facility with a number of new laboratories, such as the Genome Sciences Laboratory which will play a major role in KAIMRC’s Saudi Genome Project which uses high throughput sequencing technology to map the genomes of Saudi citizens. It aims to identify the population’s characteristic genetic traits and, ultimately, to develop personalised medical treatments based on an individual’s genomic data.

To support these efforts, KAIMRC has built up its bioinformatics department with the computational infrastructure needed for high throughput sequencing and computer-aided drug discovery. The department has already identified several novel genes that may be associated with colon cancer, said Dr Mohamed Hussein, head of the bioinformatics department.

KAIMRC also has three state-of-the-art animal research vivariums, which offer a unique environment, combining animal housing with laboratories and imaging and surgical suites, each staffed by veterinarians to ensure proper care of the experimental animals being used.

The facilities in the Riyadh building can house up to 60,000 rodents, and is the only research facility in the Gulf region that accommodates aquatic animals used in biomedical research, such as zebrafish.

The vivariums also provide KAIMRC researchers with research services ranging from recombinant DNA technology to advanced imaging techniques such as MRI and SPECT.

**Boosting medical research**

Integrating basic and clinical research is one of the major challenges in building this infrastructure. To address this, Dr Mohamed Boudjelal, head of KAIMRC’s medical platforms, proposed the establishment of a Medical Research Core Facility and Platforms Department.

This department will support KAIMRC researchers by providing them with customised biological reagents, samples and consumable materials, as well as performing assays and data analysis. It will comprise a number of different units, each with their own area of expertise.

The Cell and Tissue Unit will generate and store cell lines from different species, including fruitflies, rodents and humans, and perform cell sorting methods such as flow cytometry as well as imaging and microscopy. The Biochemical and Molecular Biology Unit will lead protein production and analysis, including protein modelling, protein structure-function analyses, and proteomics. The Research Clinical Lab will provide the services needed for analysis of blood, urine and other samples obtained from patients.

“We have already set up the core facilities for cell and molecular biology, which include the equipment needed for molecular cloning and cell culture,” says Boudjelal. Both facilities include sophisticated apparatus for real-time PCR and quantitative RNA analyses, as well as state-of-the-art cell and molecular imaging apparatus, such as a laser dissection microscope, confocal microscope, and live cell imaging system.

Additionally, KAIMRC is working on a multidisciplinary drug discovery platform to build on its basic research to identify small molecules that might be useful in treating conditions such as diabetes and cancer, and validate potential drug targets.

Understanding the needs of the Saudi population, KAIMRC also set up a Trauma Research Programme to address one of the major problems that face the Kingdom: “[Road] trauma injuries are the second leading cause of death in Saudi Arabia and represent about a fifth of all deaths,” said Dr Suliman Alghanm, a scientist at KAIMRC.

The existing infrastructure already makes KAIMRC the largest full-scale community focused research organization in Saudi Arabia, and the ongoing expansion of its infrastructure and integration of its clinical and academic research programmes will be critical for its vision of becoming a leading international translational medical research institution.