



## **Biotechnology Lab**

### **Mission**

The Biotechnology Lab of Faculty of Veterinary Medicine, Kafrelsheikh University is a research and teaching center that aims to promote biotechnology to the benefit of the productive sectors and the health, through the responsible use of biotechnology developments.

### **Vision**

Be a center of excellence in applied research, and effective technology transfer that contributes to regional and national development in biotechnology and the creation of wealth in the productive sectors and improvement of animal and human health.

### **Objectives**

The main aim of Biotechnology Lab (BL) is to use animal transgenesis, which is the production of genetically engineered livestock by both oocyte microinjection and somatic cell nuclear transfer (SCNT)-based cloning technology, to improve the productivity of farm animals (agriculture purposes) and to find a treatment for some disease in both human and animal (biomedical purposes). BL is the first center in Egypt and, of our knowledge, in the Middle East to carry out therapeutic cloning for increasing animal wealth and human health.

### **Goals**

Biotechnology Lab carries out both basic and applied researches to serve both the Egyptian animal wealth and the human health by achieving the following goals:

- 1) Production of large numbers of genetically elite animals for agricultural purposes.
- 2) Preservation of the genetic materials of the elite animal.
- 3) Production of genetically modified cloned animals with high fecundity rates.
- 4) Production of animals with higher production efficiency (milk, meat, wool, ect).
- 5) Production of animals with higher disease resistant ability (especially mastitis).
- 6) Production of animals able to resist the Egyptian environmental conditions.
- 7) Production of cloned transgenic embryos as a source of embryonic stem cells which will be a tool for speeding up the cell therapy for both human and animals.
- 8) Production of genetically modified animal able to produce human therapeutic peptides/proteins in their milk, blood or meat against human diseases like; insulin for diabetes, lactoferrin for immune disorders, and interferons for viral hepatitis and immune disorders.
- 9) Production of human antibodies, which can be used for treatment of bacterial infections or providing immune protection to immuno-deficient patients.



### **Stakeholders who might benefit from the BL**

- 1- Young researchers, MS students, PhD students and post-doc researchers in the scientific faculties (veterinary medicine, agriculture, science, pharmacy and medicine) who are interested to work in molecular biology and/or biotechnology.
- 2- Researchers in the Egyptian universities and animal research Institutes.

The benefits the stakeholders can get:

- 1- Offering substantial core facilities and training opportunities for postgraduates.
- 2- The advanced equipment and instruments will be accessible for researchers from other faculties and research centers.
- 3- Helping researchers to finish their research and to publish in reputable international scientific periodicals.
- 4- Establishment of scientific links with national laboratories, universities and organizations.

### **The executive manager of the biotechnology lab**

Dr. Mohammed Rizk Abu El-Magd El-Ghannam is the executive manager of BL who had studied and been graduated from highly reputed college, Royal Veterinary College, London University, UK. He is a specialist in various fine branches of molecular biology and biotechnology. During his study abroad, he made remarkable scientific achievements in these fields. He published his researches in highly impacted international journals and books. He currently has two big projects concerning with increase meat by production of double-muscled transgenic buffalo and chicken. These projects are funded by STDF and Kafrelsheikh University.

### **Financial sustainability of BL**

- 1- Income from biological samples processing and analysis.
- 3- Income from the scientific advisory and consultants.
- 4- Frequent training courses and workshops to students and researchers.
- 5- Sharing research projects and grants from either local or international funding organizations.



**List of available equipment in the BL:**

	<b>Equipment</b>	<b>Current uses</b>
1	Nikon Inverted tissue culture microscopy with micromanipulator	Gene transfer, cloning and production of transgenic animal
2	High-speed cooling fixed angle centrifuge	- DNA and RNA isolation - Gene cloning
3	High-speed cooling swing out centrifuge	- Tissue culture
4	Laminar flow	- RNA isolation - Tissue culture - Transgenesis and cloning
5	Leica stereomicroscope	IVM, IVF, Transgenesis and cloning
6	Labomed microscopes	Tissue culture, IVM, IVF
7	Autoclave	Sterilization of glass and plasticwares
8	Techne Gradient thermocycler (95 wells)	PCR techniques
9	Techne Gradient thermocycler (48 wells)	PCR techniques
10	Techne Gradient thermocycler (24 wells)	PCR techniques
11	Nanodrop quawell C5000	detect conc. and purity DNA, RNA

12	Multi-spin centrifuge (two)	Quick spin for samples
13	Refrigerator and -30C freezer	Storage media and prepared solution
14	In situ hybridization incubator	In situ hybridization technique
15	Memertt Water bath with shaking (two)	DNA extraction and Tissue culture
16	Fluorescence microscope	Detection of fluorescent stained slides
17	UV Transilluminator	Visualization of gel bands
18	Gel electrophoresis apparatus	Separation of gel bands (DNA, protein)
19	Microwaves	Gel preparation, Worming up solutions
20	Benchtop centrifuges	Plasmid miniprep
21	CO <sub>2</sub> incubator	Incubation of fertilized embryo
22	pH meter	Measuring pH
23	Egg incubator	Incubation of eggs
24	Protein documentation system	Photographing of PAGE
25	Liquid Nitrogen tank	Storage and transfer of samples
26	Flame photometer	Detection of minerals
27	Orbital shaker	Shaking and mixing of samples
28	Inverted tissue culture microscope	Tissue culture and stem cell
29	Digital balance	Weighting samples and reagents
30	Microbiology incubator	Incubation of bacteria









