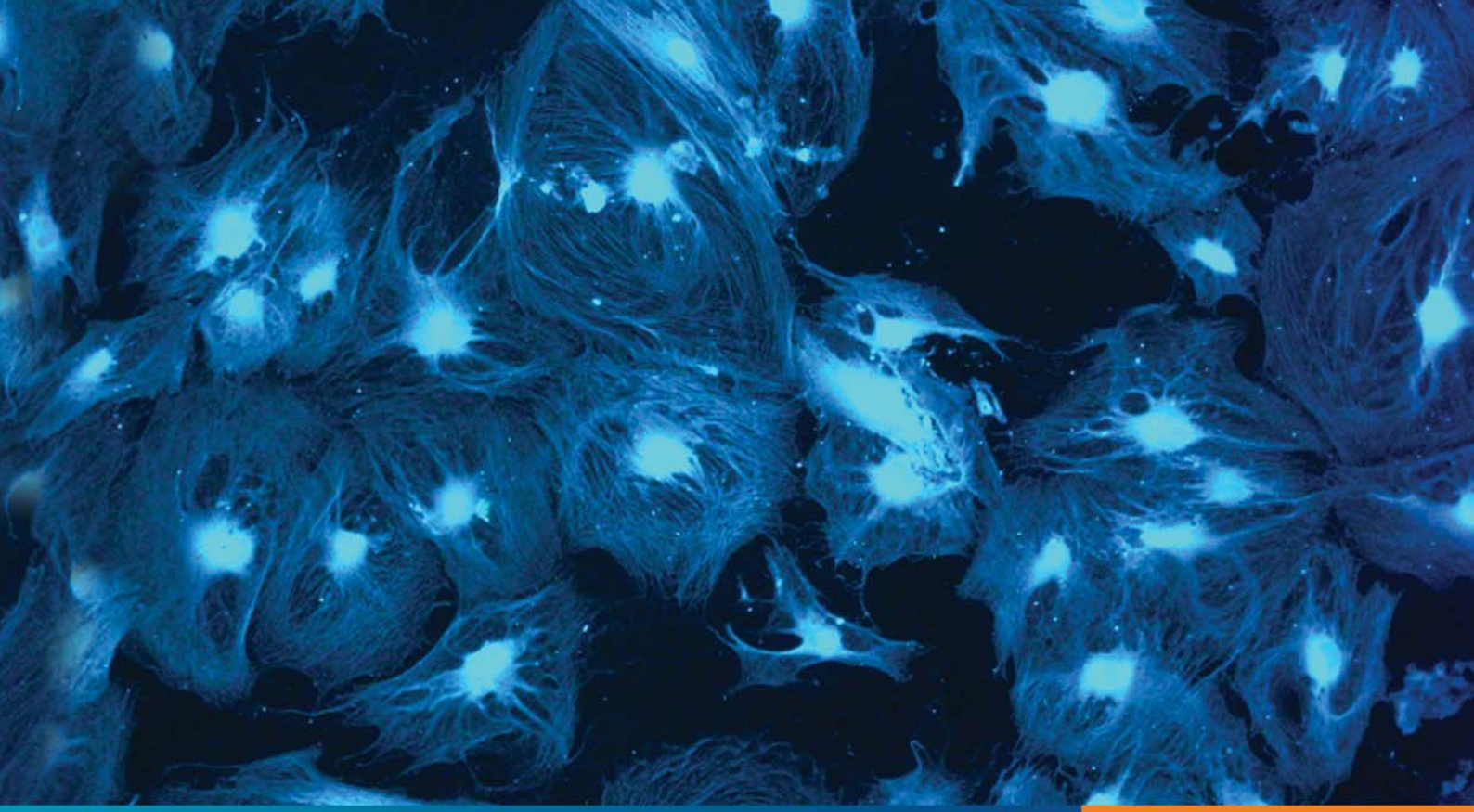


sabz BIOMEDICALS

Regenerative Medicine, Laboratory Supplies, Professional Software

- Conducting clinical trials based on engineered tissues and cell products
- Manufacturing regenerative medicine products (cell, tissue, scaffold) for clinical use
- Consultation for establishing stem cell therapy centers, constructing clean rooms, and quality management systems
- Organizing workshops and training sessions related to regenerative medicine and current laboratory techniques
- Production of laboratory supplies, research products, and professional diagnostic software

sabzbiomedicals.com

SABZ Company was established in 2009 with the aim of developing advanced technologies in the sector of stem cell science, tissue engineering, and molecular biology. In 2014, this company was certified as a science-based company by the Vice President for Science and Technology of Iran. The priority of this company is manufacturing products with high safety standards and optimum function as well as providing professional services according to ethical and scientific national and international standards by expert specialists of the field.

The founders of the company are all faculties of Iran top universities and awardees of Razi Scientific and Research Festival. They have registered several patent applications and published many research papers in stem cell research, regenerative medicine, and molecular biology.

sabz
BIOMEDICALS

Cell Products

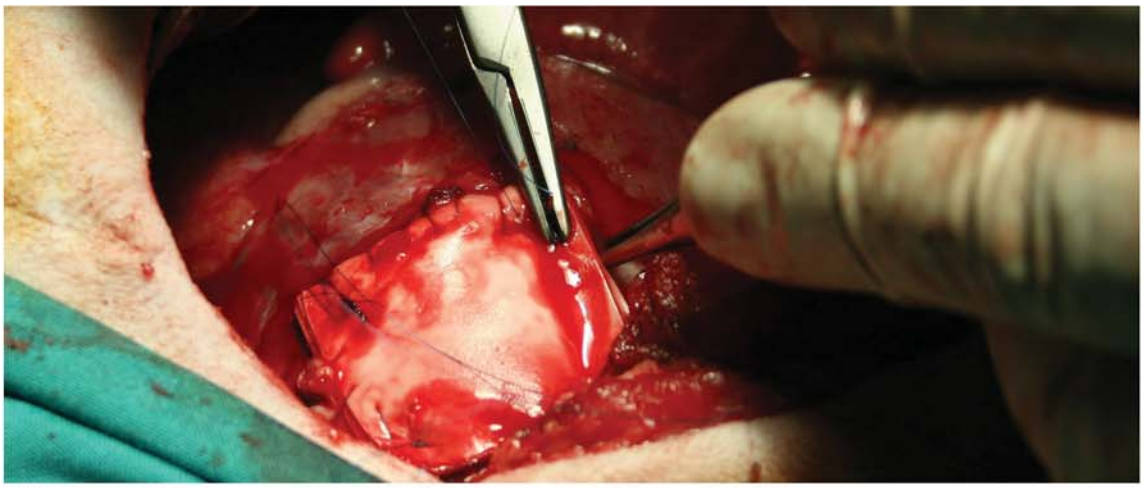
In recent years, cell therapy and tissue engineering has reached a significant importance in modern medicine. One of the essential parts of cell therapy is the maintenance and expansion of cells in culture for clinical applications. This process requires not only routine laboratory protocols but also special rules and regulations for safe and optimum production of these cells. SABZ has established infrastructures necessary for these products, including clean room and laboratory instruments. In addition, we have a team of experts in the field of cell therapy. The manufacturing process of the cell lines below are according to international and good manufacturing practice (GMP) standards and these products are certified for use in clinical trials.

Human Bone Marrow Derived Mesenchymal Stem Cells	SB-11001
Human Cord Blood Mesenchymal Stem Cells	SB-11002
Human Placental Mesenchymal Stem Cells	SB-11003
Human Endometrial Mesenchymal Stem Cells	SB-11004
Human Adipose Tissue Derived Mesenchymal Stem Cells	SB-11005
Human Skin Fibroblasts	SB-11006
Wharton Jelly Mesenchymal Stem Cells	SB-11007

Cell-Based Clinical Trials

SABZ is certified for conducting cell therapy for specific diseases according to ethical and scientific protocols. These include:

1- Treatment of traumatic joint injury using autologous chondrocytes
2- Treatment of arthritis using fat and embryonic mesenchymal stem cells
3- Treatment of resistant chronic wounds using amniotic membrane stem cells



sabz BIOMEDICALS

Replacement of injured tissue with homologous human tissues has a long history. Traditional Persian medicine has a number of examples in which tissues, like bone, have been used to treat bone fractures. Recent advances in the field of transplantation have revolutionized the use of tissue and cell-based products in clinical setting. As a result of these discoveries, organ and transplantation banks have been developed in the United States and Europe during the past decade. Today, many of these centers are operational around the world to provide services for patients. Along that line, SABZ has developed two bio-implant products termed SABZ Bone® and SABZ Dress® for clinical applications.

SABZ Bone®

This implant is from bone tissues donated by individuals that are deceased or they are obtained from remnants of tissues following surgery after obtaining ethical and legal authorization. We closely evaluate these tissues and if they are eligible for clinical use, we begin processing them in an aseptic environment and further in the clean room. Then tissues are tested for viral and bacterial contaminations and samples with a negative result will be processed in a multi-step procedure to obtain bone powder or bone fragments.

SB-12003

Clinical Applications

- Orthopedic surgeries: bone cyst, benign tumors as well as acute and chronic infections due to traumatic bone lesions or defective bone repair.
- Neurosurgical application: Bone fixation and vertebral fusion
- Dental surgeries: Periodontal ligament strengthening, gingival regeneration, and implant site preservation

Product Features

- Transplanted material is not subject to rejection
- Less limitation in size and reduced complications compared to autograft tissues.
- Osteoinduction (demineralized small bone fragments) and osteoconduction (large bones)
- Improved biocompatibility and biodegradability compared to synthetic materials

SABZ Dress®

SABZ Dress is a biological dressing made up of human amniotic membrane. The product has a unique and special composition of a variety of growth factors that promote the repair or replacement of the injured epithelial cells. This product was successfully used in several clinical trials and reduced scar formation and post-traumatic infection of the wounded area. SABZ Dress® induces epithelial cell proliferation at the wound site, which is essential for successful wound healing. Considering the biological sources of these products, all the donors are evaluated based on the clinical and paraclinical exams (according to the standards of American Tissue Bank) to avoid any bacterial contamination

Clinical Applications

SB-12001

- A natural dressing for burns
- Treatment of chronic resistant wounds, such as bed sores and diabetic wounds
- Scaffold for skin and cornea tissue engineering
- Repair of oral and dental wounds
- Urosurgical applications

Features of the Product

- Easy to use
- No immune reaction
- Availability in different sizes according to the customer need
- Cost effectiveness compared to other biological dressings

Consultation and Education to Establish Cell Therapy Centers

Clinical and research-based activities on stem cells have been growing extensively in recent years. The need for maintaining high international standards in the research environment is of great importance. Establishing centers for regenerative medicine requires technical knowledge of clinical grade cell production. It also demands expertise on rules and regulations of the field. SABZ has worked with an outstanding team of scientists in the field of cellular therapy who are experts in quality control and international standards. This group has established a history of training, research, education, and consultation. We provide these professional services to the customers:

1. Consultation for the establishment of cell therapy centers

- Finding appropriate locations for cell therapy centers
- Designing specific sections within the cell therapy center according to international standards
- Evaluation of contractors at every step in the establishment of clean rooms and working environment.
- Designing the lab bench organization
- Consultation for purchasing laboratory supplies

2. Consultation for establishing quality control systems based on international standards to attain required certifications

- Establishing quality control systems in the organizations based on international standards including ISO.
- Consultation for obtaining required documents necessary for verifications and obtaining international ISO certificates.
- Obtaining and updating standard operational procedures (SOP) for different sectors of the cell therapy center
- Adaptation of all processes to Good Manufacturing Practice (GMP)

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3. Consultation in design, registration, and establishing cell-based clinical trials

- Consultation in designing stem cell-based clinical trials
- Designing protocols for stem cell-based clinical trials according to GMP
- Consultation for registration of clinical trials in international databases
- Consultation for optimum production of cell-related products for clinical applications

4. Providing theoretical and practical training courses related to cell therapy

- Basics of working in controlled environments and clean rooms
- Basics of stem cell production for clinical applications
- Introduction to GMP and its applications in regenerative medicine
- Basics of quality management in biological sciences
- Aseptic procedures and their application in regenerative medicine
- Isolation, culture, and characterization of mesenchymal stem cells
- Basics of tissue engineering

5. Providing support and initial leadership of cell therapy centers after set up

- Scientific and technical support of stem cell centers from initial set up until the contract end date
- Training the staff and providing supportive observation until the team is independently operational

These consultations have been provided to Shahed University and Tehran, Shiraz, Mashhad, Isfahan, and Tabriz Universities of Medical Sciences.

saba BIOMEDICALS

Design and Construction of Clean Rooms

Clean rooms in cell-based products and bio-implants

International and national organizations monitor GMP rules and regulations that are required for safe and reproducible production of bio-implants and cell-based products used in clinical trials. One of the fundamental steps in this process is establishing an aseptic work environment. This environment is termed a clean room and is defined according to ISO as a room that is maintained with a low level of environmental pollutants, such as aerosol particles. Temperature, humidity and air pressure are tightly controlled in clean rooms.

Clean room standards and their applications

There are several standards for the establishment of clean rooms, including PICS-GMP, EU-GMP, US Pharmacopeia, ISO14644 and WHO-GMP. Observing these standards requires not only the engineering skills of clean room construction, but also an extensive knowledge of the process of manufacturing stem-cell products, which is fundamentally different from pharmacological products and biological drugs. At SABZ, we have an expert professional team with expertise in designing and establishing pharma plants and clean rooms as well as experts in the field of standard rules and regulations and quality management in the field of stem-cell products. Having such an interdisciplinary team is one of the unique features of our group that allow us to provide multifaceted, cost-effective services.

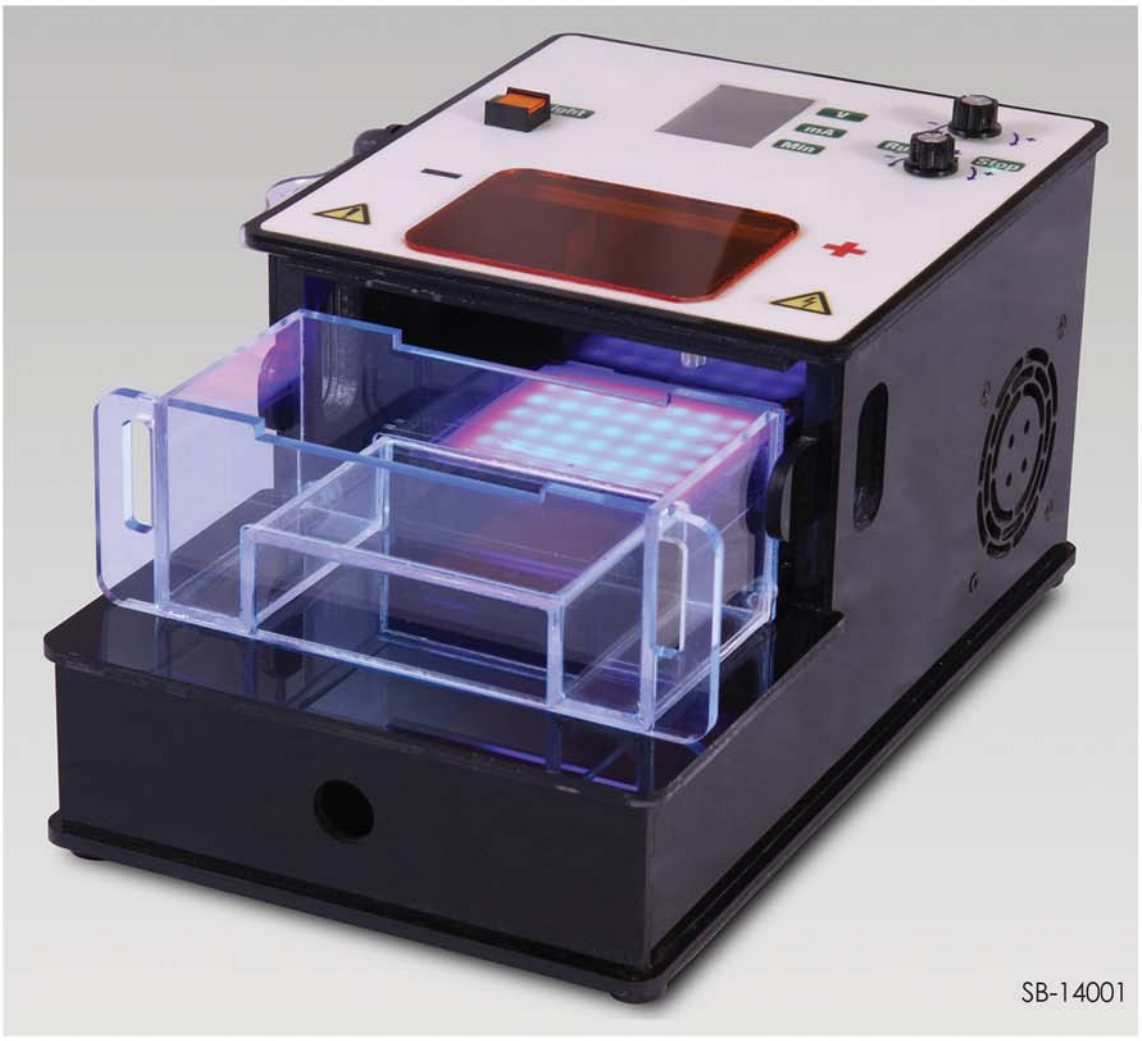
sabz BIOMEDICALS

Consultation, design, and construction of clean rooms for cell and tissue-based products

Clean rooms are graded based on the count of particles according to different standards, such as GMP, ISO and 209E. Contrary to other standards, in GMP, the concentration of biological units is considered in the definition of cleanness instead of total particles.

At SABZ Corporation, we first identify the best available location for the construction of the cell therapy center and determine the manufacturing processes based on the intended products. After preliminary meetings with the scientific board of the customer institute, the first draft of the design documents and specifications will be prepared to be evaluated by the food and drug administration of the ministry of health. After obtaining the certifications, we start to set up the clean rooms and will adhere to quality control procedures. SABZ can also provide customers with consultations on benching, preparing lab supplies, and production management.

All in One Electrophoresis System®



SB-14001

In this system, the electrophoresis tank, power supply, and transilluminator are combined. Instead of using three different instruments, we have one multi component system, which substantially reduces the space required for post PCR steps. Another feature of this system is the ability to visualize DNA bands while the electrophoresis is operational. This system uses a special blue wavelength instead of UV light in the illuminator, which reduces the risk of health hazard and prevents damage to the PCR product.

- Power source of 0-150 V (500 mA)
- Voltage, Amp, and timer display
- Platinum electrodes
- Gel casting tray with thin and thick combs
- Plexiglass container
- Drawer-like electrophoresis tank
- 7×10 cm gel cast
- Tank volume of 640 ml

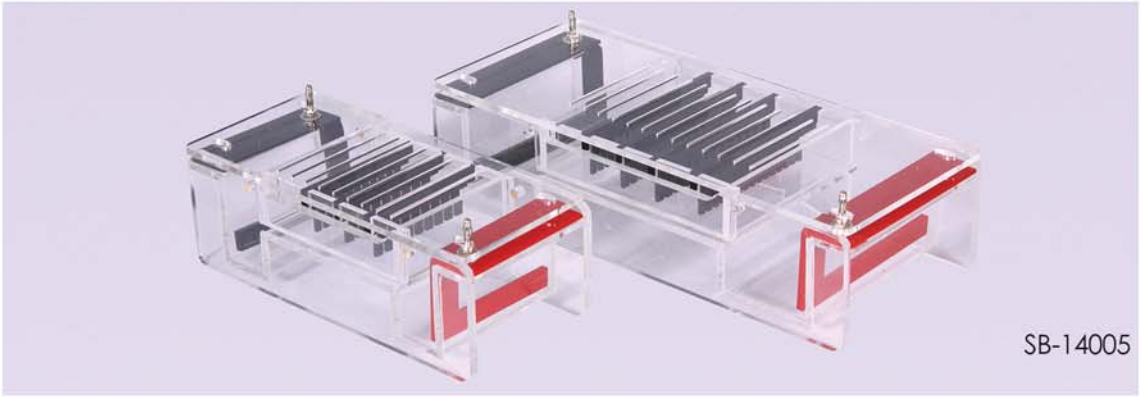
Vertical electrophoresis tank

SB-14019

This device can be used for high resolution separation of DNA, RNA, and protein in multiple techniques, such as enzymatic immune-electrophoresis and Southern/ Northern/Western blotting.

- Double sided
- Gel size: 8.6×7.3 cm
- Short plate: 7.3×10.1 cm
- Long plate with spacer: 8.2×10.1 cm
- Buffer volume: 700 ml
- Size: 12×16×18 cm

Vertical electrophoresis tanks



SB-14005

Horizontal electrophoresis tanks are provided in three different sizes:

Size	Reference number	Buffer Volume (ml)	Gel size (cm)	Combs
Small	SB-14005a	300	7×10	7 and 10 wells
Medium	SB-14005b	700	10×13	11 and 16 wells
Large	SB-14005c	1000	15×15	15 and 21 wells

- High user safety
- Platinum electrodes
- Plexiglass body
- Stylish design

sabz BIOMEDICALS

Image Pad M1
DNA and Protein Imaging System

This instrument has the simultaneous functions of both gel doc and Western blot imaging systems. It allows the visualization of DNA electrophoresis gels and chemiluminescence protein bands with high quality images. In routine Western blotting, several time- and labor-intensive steps should be followed for the development of X-ray sensitive films. It also requires different reagents and access to a dark room. Our luminescence-based system allows customers to detect signals without using a dark room and old fashioned film system. The device is equipped with SABZ LadderVision®, a user-friendly and powerful software for gel image analysis and densitometry.
This instrument is cost effective and optimizes the lab space required for these techniques.

SB-14017

- Imaging system: 18 megapixel camera
- 15 inch display
- Compatible with different DNA stains
- Chemiluminescence signal detection
- Different light sources (blue, white, and UV)
- Automatic filter exchange
- LAN and USB ports, memory card
- Metal structure and electrostatic surface color
- Tester paper for quality control
- Editing and analysis after image acquisition
- The capacity to edit and add text to images

Gel Documentation System

SB-14006

This instrument allows for high quality visualization and recording of DNA bands. In addition, the UV Transilluminator can be moved on a rail to allow direct examination of the DNA bands for cases where the gel needs to be cut for isolation of specific DNA bands. The gel images can be easily visualized with the large display on this instrument. The device is equipped with SABZ LadderVision®, a user-friendly and powerful software for gel image analysis and densitometry.

- Camera: 12.1 megapixel
- 12 inch display
- USB port and memory card
- Protection shield for cutting the gel
- Safety micro switch for user safety
- Tester paper for quality control

Western Blot Imaging System

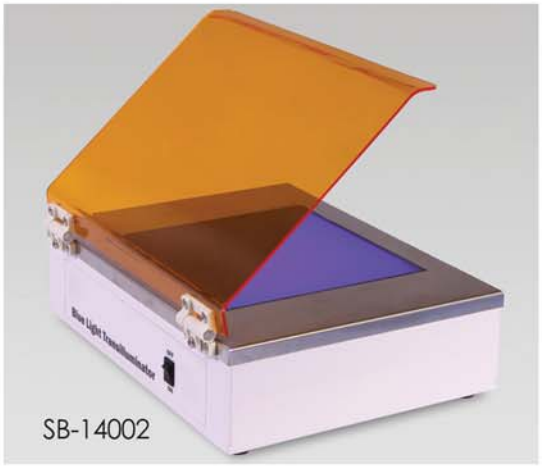

SB-14007

In routine Western blotting, several time- and labor-intensive steps should be followed for the development of X-ray sensitive films. In addition, it requires different reagents and access to a dark room. Our luminescence-based system allows customers to detect signals without using dark room and an old fashioned film system. The device is equipped with SABZ LadderVision®, a user-friendly and powerful software for gel image analysis and densitometry.

- Camera: 18 megapixel
- 12 inch display
- USB port
- Setting options for time-lapse imaging
- Tester paper for quality control

sabz BIOMEDICALS

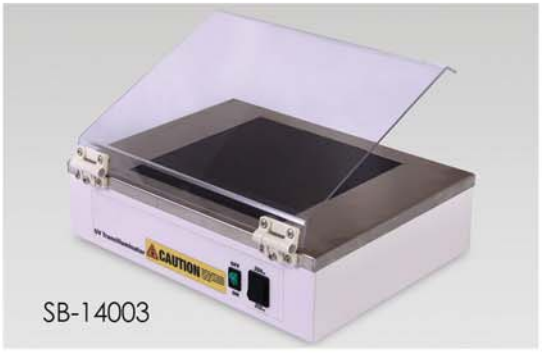
Blue Transilluminator


SB-14002

This instrument is a good substitution for UV transilluminator for detection of DNA in gel electrophoresis. This system uses a specific blue wavelength without relying on UV for detection of signal and hence there is no UV-induced DNA damage in the process of detection.

- High user safety
- Long lifetime of the light source
- Adequate workspace for cutting the gel
- Stylish design with steel filter frame
- Filter size: 20×20 cm

UV Transilluminator


SB-14003

This instrument is commonly used for visualization and cutting of DNA bands in gel electrophoresis. UV light source and filters that are used in this system causes maximum excitation of fluorescent dyes attached to DNA.

- 254 and 312 nm wavelength
- Long lasting filter
- Protective shield
- Filter size 20×20 cm

PCR workstation


SB-14008b

This system provides a separate space with an air filtration system during preparation of PCR samples, which reduces the risk of contamination and false positive results.

- UV sterilization system for internal space
- UV sterilization system for air flow
- Air flow with three layer carbon filtration system
- Setting options for decontamination
- Graphic display to show settings
- Micro switch for user safety

SABZ ECM Spinner®

This instrument is used to produce electrospun nano-scaffolds for tissue engineering. This instrument has two pumps and four distinct syringes to spin up to four different polymers from two directions. It can conduct the spinning of a polymer from 10 separate nozzles to reduce the time of synthesis. Another feature of this instrument is the scanning movement of the collector that allows customized scaffold widths. The electro-spinning parameters can be programmed for the synthesis of different scaffolds (non-woven, parallel, compound, bead on string, etc). This instrument has a high user safety.

- Syringe pumps are located outside of the instrument to increase accessibility and safety
- Three-layer filters are used to exclude toxic and odorous solvents
- Coaxial spinning
- 7 inch touch screen
- Equipped with user-friendly software
- Rotation speed of the drum: 200-300 rpm
- Spinning distance: 5-20 cm
- Nozzle scan speed: 0-2500 mm/min

sabz
BIOMEDICALS

SABZ DynaCulture® Bioreactor

SB-14011

This instrument if used for the dynamic culture of non-adherent cells, such as hematopoietic stem cells. This instrument can also be employed for cell culture in recombinant protein production. It can also be customized for tissue culture purposes. SABZ Dynaculture® provides an optimum environment for the cells via automatic media exchange and tight control of culture conditions.

- Dynamic culture of non-adhesive cells in semi-industrial scale
- Providing optimum CO_2, humidity, and temperature for cell culture
- Perfusion system consist of two separate peristaltic pumps
- 10 inch touch screen
- USB port
- HEPA filtration
- Real time data logging

sabz BIOMEDICALS

Perfusion Culture System

This instrument produces a continuous flow of medium with adaptable volume and speed for the 3D culture of tissues, mimicking physiological conditions for tissue engineering. Although CO_2 and temperature cannot be regulated, the size of the instrument makes it easy to fit in a CO_2 incubator. If you need to control all culture parameters in a single advanced device, we recommend our other product, SABZ DynaCulture® Bioreactor. However, the Perfusion Culture System is an economical solution for a variety of tissue engineering projects.

- Acrylic frame with anodized aluminum
- Graphic screen for parameters visualization
- Customizable for different applications

SB-14018

CO_2 Incubator

This instrument controls temperature, humidity and CO_2 for optimum cell culture condition.

- Internal volume: 108 liter
- Temperature control with the accuracy of 0.1°C
- Humidity control with the accuracy of 2%
- CO_2 control with the accuracy of 0.3%
- 7 inch touch screen
- USB port
- Interior space and trays made of stainless steel
- Data logging


SB-14012

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SABZ Animal Lab
Pre-assembled, ready to use animal laboratory

Laboratory animals are an integral part of biomedical research. However, establishing a standard laboratory animal is a big challenge for some scientific centers. To overcome this issue, SABZ has established a small standard portable animal lab for midterm use.


SB-15001

- Surface area: 36 m^2 (length: 12 m, width: 3 m, and height: 2.8 m)
- Three separate spaces for different animals, working space, and storage
- Washing sink
- Sandwich panel body to stabilize temperature and seal against noise and humidity
- Doors and windows are UPVC with two layer glass shield
- Air conditioner system
- Temperature and light control

Mouse cage


SB-15003

- Suitable for laboratory mouse
- Autoclavable polycarbonate body
- Tight fit door with locks

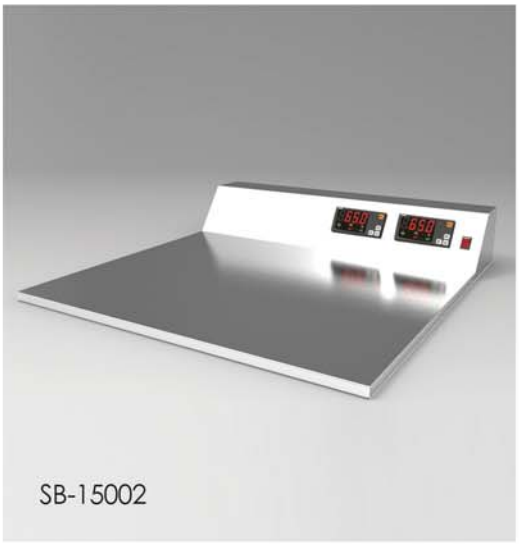
Water bottle


SB-15005

- 500 ml volume
- Silicon washer and screw top cap
- Designed to fit with the cage
- Suitable for both mice and rats

sabz BIOMEDICALS

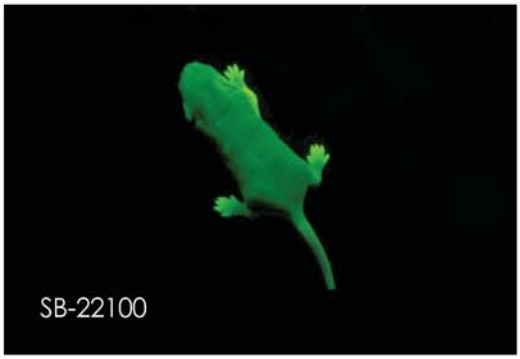
Warm Stage


SB-15002

During anesthesia and surgical procedures of laboratory animals, hypothermia may occur that is a confounding factor for most studies. This instrument maintains small animals' body temperature at an adjusted point. This system includes a temperature control, hot plate, and temperature sensors.

- Two separate displays for the stage and animal body temperatures
- Homogenous heat distribution
- Accuracy of temperature control: 0.1°C
- Stainless steel body

GFP-transgenic C57BL/6 mice


SB-22100

These mice are from C57BL/6 background with Green Fluorescent Protein (GFP) expression under the control of CAG promoter. The mice are apparently healthy without any obvious abnormal phenotype. These mice have been used extensively for cell and tissue transplantation studies.

Disease animal models

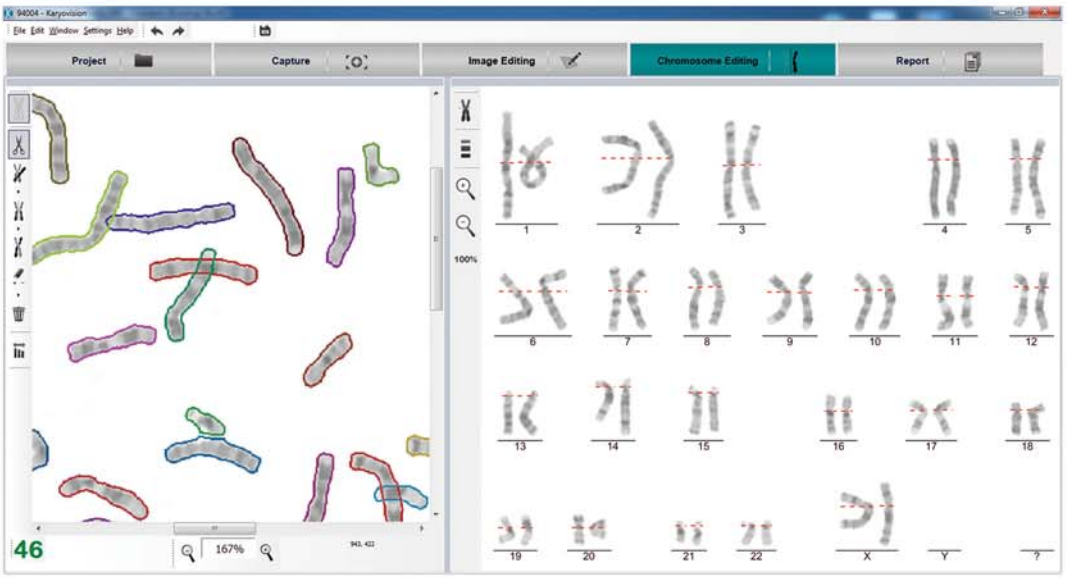
Animal models are critical tools in biomedical research. However, development of such models is not always straightforward and may become a rate-limiting step. SABZ provides the following animal models:

Mouse Model of STZ-induced Type I Diabetes Mellitus	SB-22001
Mouse Model of Irradiation-Induced Anemia	SB-22002
Mouse Model of Cisplatin-Induced Acute Kidney Injury	SB-22003
Mouse Model of CCL4-Induced Acute Liver Failure	SB-22005

KaryoVision®

KaryoVision® is powerful and efficient software for analyzing and reporting cytogenetic tests. The software is designed for fast, accurate, and simple use with an attractive and consistent user interface. It is provided as an integrated package composed of an imaging tool and hardware (case, monitor, printer, and keyboard).

- Compatible hardware for optimal function of the software
- High quality full HD camera with live imaging at 30 frames per second
- Wide visual field to image several metaphases in a single frame
- Software is connected to the camera for online capture and processing
- Capacity to analyze images saved with multiple formats or live images directly from the camera
- Detection and separation of overlapping chromosomes
- Automatic and manual chromosome separation
- Automatic alignment of chromosomes
- Drag and drop option to move chromosomes in the karyotype
- Multiple windows to view the final image while editing the karyotype
- Customized report layout with options for format and logo specific to the user laboratory
- Different formats for exporting the reports
- One year free update



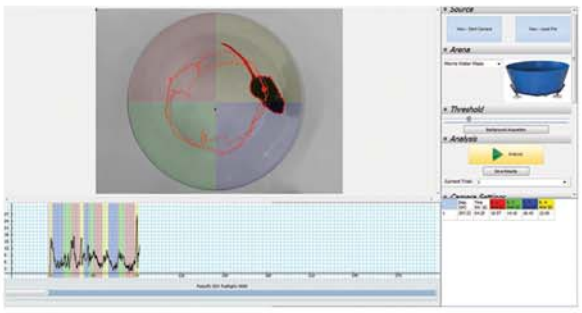
SB-18002

Establishing Karyotype Labs

Cytogenetic is a very potent tool in genetic diagnosis and counseling. SABZ can train personnel and establish this technique in research and diagnostic laboratories according to the customers' needs.

MazeVision®

MazeVision® is comprised of an imaging system and image processing software for tracking, and analyzing laboratory animals' movements in behavioral experiments. The software can distinguish the animal from the surrounding environment and track animal movements. The recorded data then can be analyzed for different parameters such as speed, distance, type of motion, and the time spent in one area.



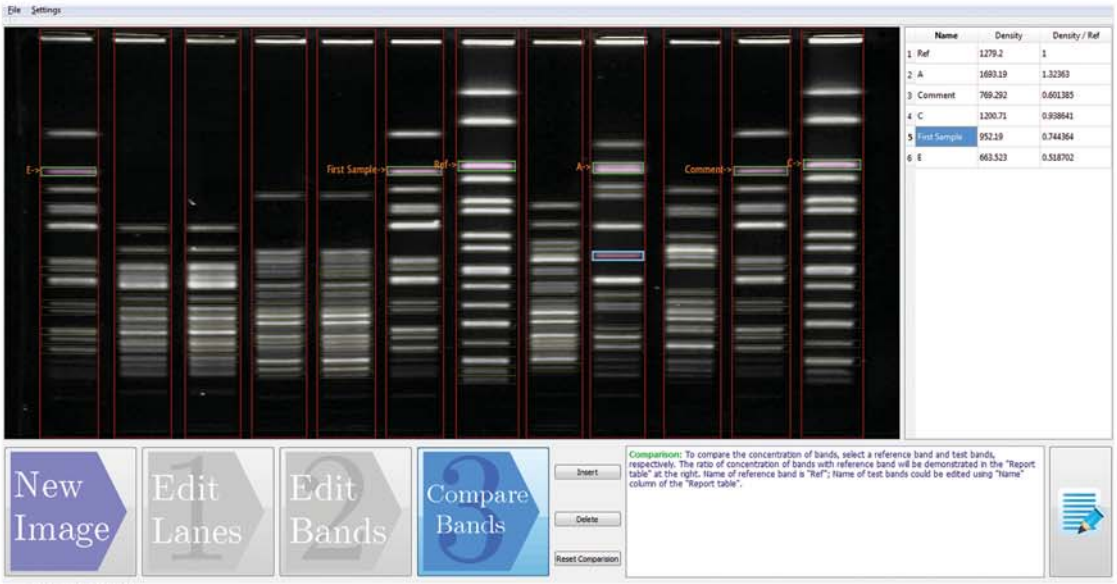
SB-18001

- Accepts previously recorded files or videos with different formats
- The background can be defined as static or dynamic
- Compatible with different mazes
- Sectors and order of experiments can be defined by the user

Ladder Vision®

This software is for analyzing gel electrophoresis images. The bands are automatically detected and densitometry can be performed to compare different bands with each other or with a standard to estimate the concentration of DNA or protein in a given band.

- Gel analysis in 4 simple steps
- Automatic detection and manual optimization of band borders
- Guide ruler
- Background reduction
- Annotation of the image or result table

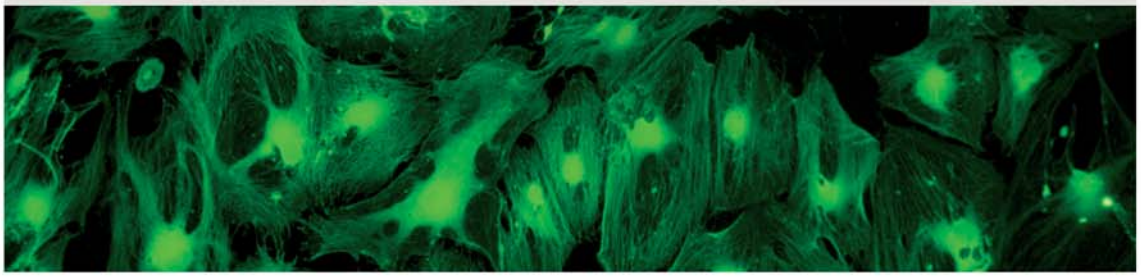


SB-18003

Stem cell bank

These cell lines are available in culture or frozen vials for research use only. For in vivo tracking, the cells can be labeled with lentiviral vectors encoding GFP reporter gene.

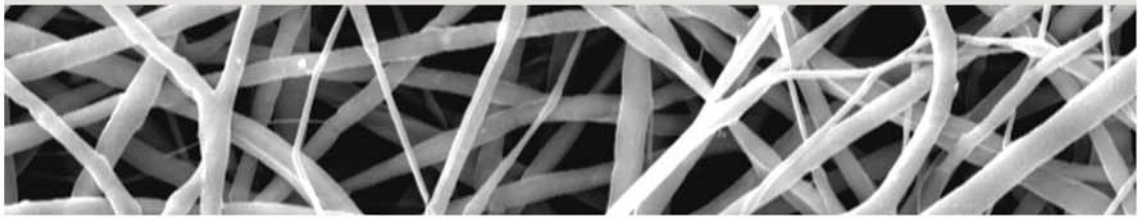
Human Embryonic Stem Cells	SB-11008
Human Bone Marrow Mesenchymal Stem Cells	SB-11009
Human Placental Mesenchymal Stem Cells	SB-11010
Human Unrestricted Somatic Stem Cells (USSC)	SB-11011
Human Adipose Derived Mesenchymal Stem Cells	SB-11012
Mouse (NMRI) Embryonic Fibroblasts (MEF)	SB-11013
Mouse (BALB/C) Bone Marrow Derived Mesenchymal Stem Cells	SB-11014
Mouse (C57BL/6) Bone Marrow Derived Mesenchymal Stem Cells	SB-11015
Mouse (BALB/C) Adipose Derived Mesenchymal Stem Cells	SB-11016
Mouse (C57BL/6) Adipose Derived Mesenchymal Stem Cells	SB-11017



Scaffolds

The following scaffolds are provided for tissue engineering research projects. They are for research use only and not certified for clinical applications.

PLLA Electrospun Scaffold	SB-12007
PCL Electrospun Scaffold	SB-12008
PVA Electrospun Scaffold	SB-12009
Hydroxyapatite	SB-12010
Bioactive Glass	SB-12011



sabz BIOMEDICALS

Workshops

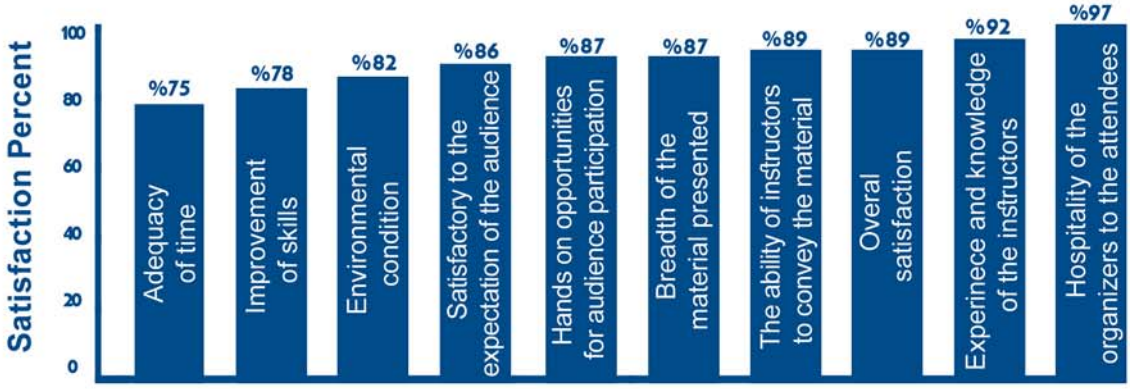
- Gene delivery to mammalian cells (non-viral methods and lentiviral vectors)
- Isolation, culture, and differentiation of mesenchymal stem cells
- Isolation and culture of embryonic stem cells
- Isolation and culture of cord blood stem cells
- Gene cloning and genetic engineering
- Animal handling techniques
- Real time PCR
- Bioinformatics
- Flowcytometry
- Tissue engineering
- Aseptic techniques
- Quality management in biomedical research
- Philosophy of science and experimental design for biologists

In addition to the above workshops, SABZ has been collaborating with several universities to conduct graduate courses:

- Isfahan university of Medical Sciences, Department of Genetics and Molecular biology
- Tehran university of Medical Sciences, GI and Liver Research Institute
- Tehran university of Medical Sciences, Nanotechnology Research Center
- Tehran university of Medical Sciences, Endocrinology Research Center
- Tehran university of Medical Sciences, Cardiovascular Research Center

All the certifications are available online through sabzbiomedicals.com

The results of several past workshop surveys are shown below



Strategic studies in regenerative medicine

Developing regulations and standards for the design and conduct of cell-based clinical trials are an integral part of translational research and provide frameworks for biomedical researchers, clinicians, ethics committees, and founding agencies. SABZ has developed the first draft of “the national guideline for clinical application of stem cells and cell-based clinical trials” for Food and Drug Administration of the ministry of health.

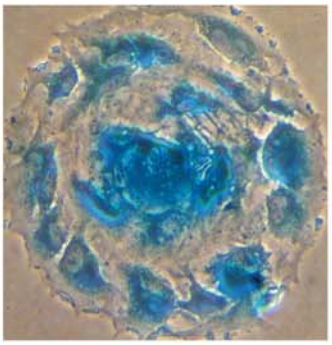
In science and technology policy making, it is essential to have a good understanding of current situations and future directions. SABZ has performed some scientometry project including a study on ‘stem cell and tissue engineering research in Iran” ordered by National Stem Cell Research Council.

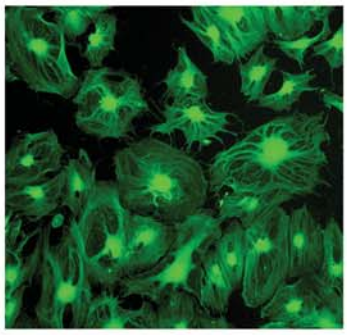
sabz BIOMEDICALS

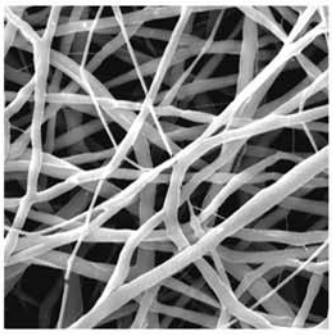
List of products

Work Together, Win Together

There are many researchers with distinguished and creative ideas for the production of science-based products. Manufacturing and commercializing these products at larger scale requires complex processes that are not often accessible for everyone. SABZ has a good history in shaping ideas into products. If you have any creative idea, please contact us to negotiate how we can do it together.





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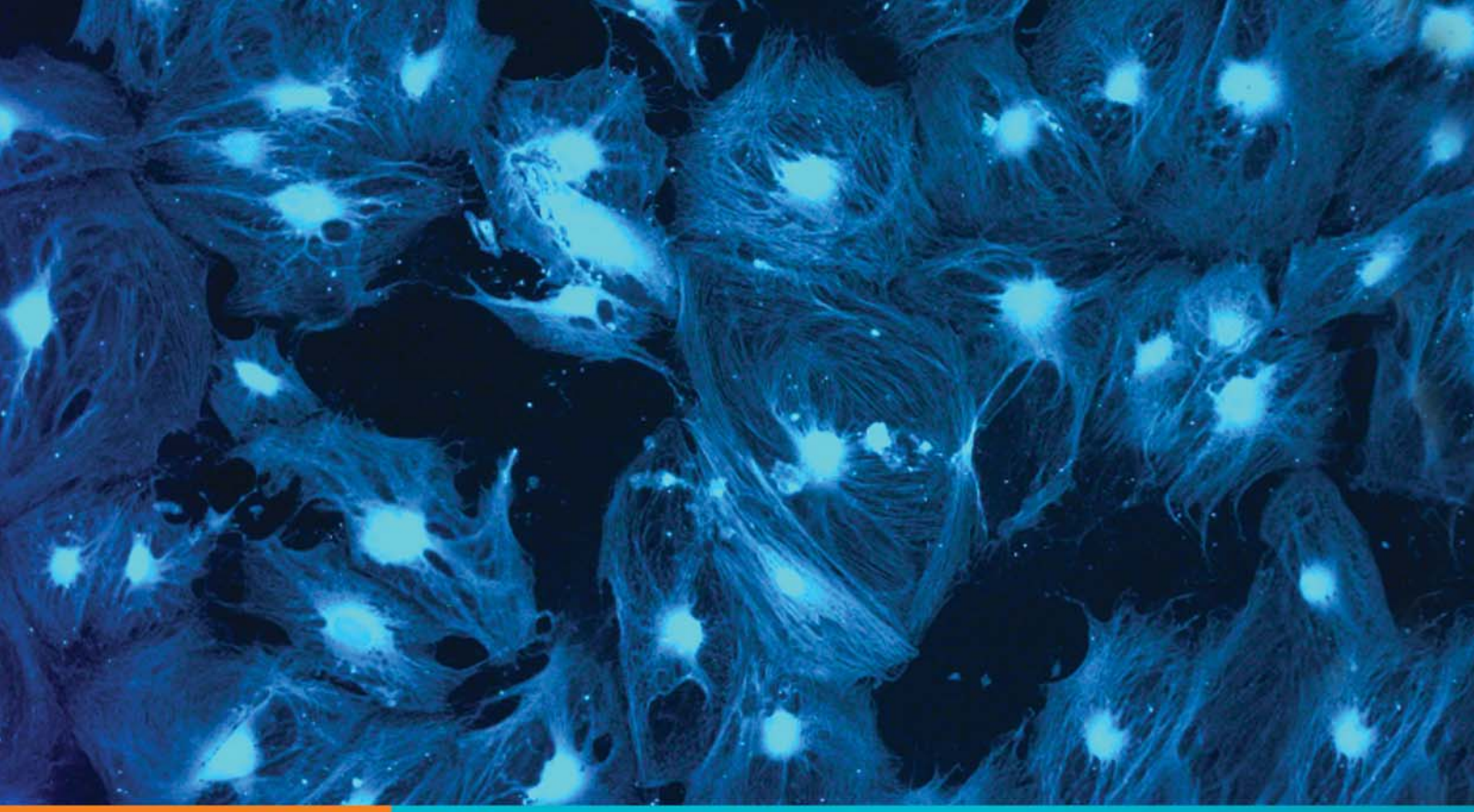

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