Introduction

Brief introduction:

Biotechnology is technology that utilizes biological systems, living organisms or parts of this to develop or create different products (1).

Genetic engineering is the process by which scientists modify the genome of an organism. Creation of genetically modified organisms requires recombinant DNA. Recombinant DNA is a combination of DNA from different organisms or different locations in a given genome that would not normally be found in nature. The manipulation of genetic material will produce organisms with desired heritable traits or characteristics. On the other hand, this manipulation could have some potential risks, for example, the inserted genes may have unexpected harmful effects (2).

General lab safety and types of hazards in biotechnology lab

As shown in Safety lab sheet.

Sterile technique for Bacterial cultures.

All strains of Escherichia coli are potentially pathogenic. Before opening any culture vessel think carefully. What needs to be done before and after manipulation? What you are going to do with the culture vessel? What you are going to do with any equipment that has come into contact with its contents?

Safe sterile technique is largely a matter of common sense. It has two major aims:

1) Preventing contaminant organisms from getting into your cultures. Contamination into cultures can occur from the air when cultures are opened for manipulation, so open them for a minimum time and use smooth movements to reduce sudden air currents. It may also occur from unsterile equipment, as when a pipette-tip touches your filthy, bacteria-laden hands, so be careful with any used pipette, dispose them immediately.

2) Preventing any organisms or accidental contaminants from getting out. Escape from cultures can occur from dripping pipettes, from putting used spreaders and inoculating hoops on the bench without sterilising them first, by aerosols formed by blowing bubbles through cultures with pipettes, or by rapid air movement (particularly with dry fungal spores).

The media and glassware you have been provided will be autoclaved in steam at 121°C for 20 min. However, the mouths of culture tubes, inoculating hoops and spreaders will need to be flamed using with a Bunsen burner. Used pipettes and discarded tubes must be disposed of into disinfectant. Use proper sterile technique whatever the organisms that being used. Because you never know when a culture may have been contaminated, and you owe a duty of care to yourself and others not to filthy your lab space with potentially pathogenic bacteria.

Practical hints to remember during your work in biotechnology lab:

1) Always wash your hands and spray with 70% ethanol or wear gloves.
2) Always keep the caps on the polystyrene tubes loose so that air can circulate. Only cap tightly when the cells are no longer growing and are being stored in the refrigerator until the transformation efficiency has been calculated.

3) When scraping the frozen cell sample, hold the microcentrifuge tube at the top rather than at the bottom, so that the sample does not fully thaw. (one may want to keep the frozen samples on dry ice.)
4) Always have a negative control in the experiments. A negative control is used to show that the media is not contaminated and what is growing in the media are the bacteria cells and not contaminants.
5) Ampicillin can cause allergic reactions on contact with skin to those who are sensitive to penicillin. Do not touch the agar.

Sources of information

https://www.dropbox.com/sh/lxl4iex153oq7m1/AACF8fuS-PCOZYceQVhRdO1ia?dl=0

References:

1) https://www.ntnu.edu/ibt/about-us/what-is-biotechnology
2) https://library.scotch.wa.edu.au/sciences/year10/biotechnology/geneticengineering