University of Jijel

Faculty of Natural Sciences and Life

Department of Molecular and Cellular Biology

Master 2 in Molecular and Cellular Biology

TD3 **Biotechnological applications of recombinant DNA (ABAR)**

Exercise 1

To optimize the production of soluble recombinant human growth hormone (rhGH), this study evaluated the impact of various factors—such as temperature, IPTG concentration, induction time, E. coli strains, glycerol, and ethanol—on rhGH expression levels.

Answer the following questions based on the presented image:
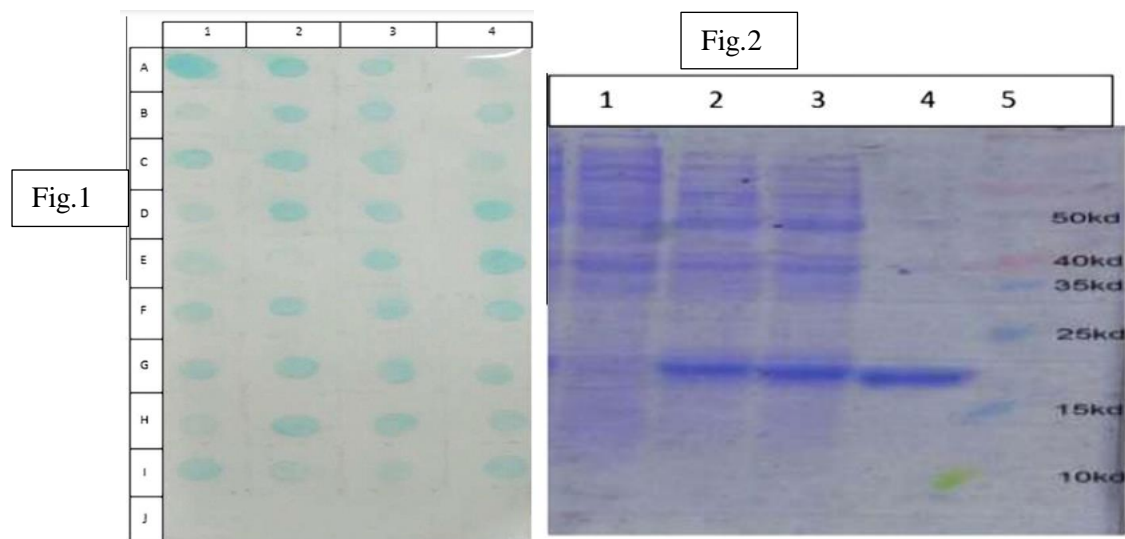
Fig. 1. Represents dot-blotting for detection of soluble rhGH. A1: GH 1 mg/ml, A2: GH 1/10 mg/ml, A3: GH 1/100 mg/ml, A4: GH 1/1000 mg/ml Fig. 2. SDS–PAGE (12%) analysis of rhGH expression. Lane 1: control; lane 2: the supernatant (soluble) fraction of Rosetta-gami lysate; lane 3: the supernatant (soluble) fraction of Origami lysate; lane 4: standard GH as positive control; lane 5: molecular weight marker (ladder).

1-What is the purpose of the dot-blotting technique in this experiment?

2- Define the role of concentrations A1 to A4.

3- Based on Fig. 2, which strain appears to express more of the recombinant protein in the soluble fraction?

4- What is the purpose of comparing the Rosetta-gami and Origami cell lysates in this rhGH expression study?

5- How can the molecular weight of the expressed rhGH protein be determined from the SDS-PAGE analysis?

6- What do the samples B1 to I4 represent, and how do they relate to the primary detection?
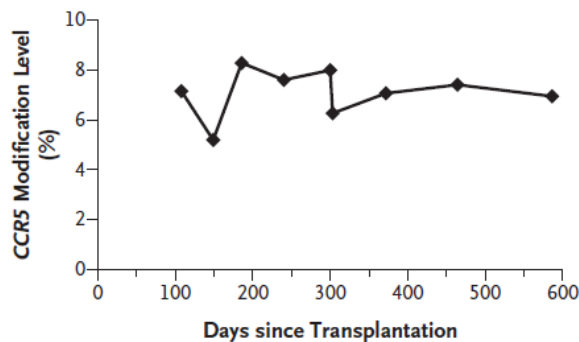
Exercise 2

Based on these figures, what conclusions can be drawn about the success and challenges of the combined transplantation and gene therapy (Crispr technology) approach used to treat this patient with HIV and Acute Lymphocytic Leukemia?
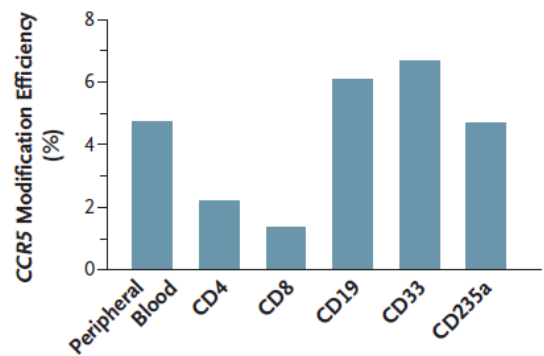

A Cell Counts in Peripheral Blood
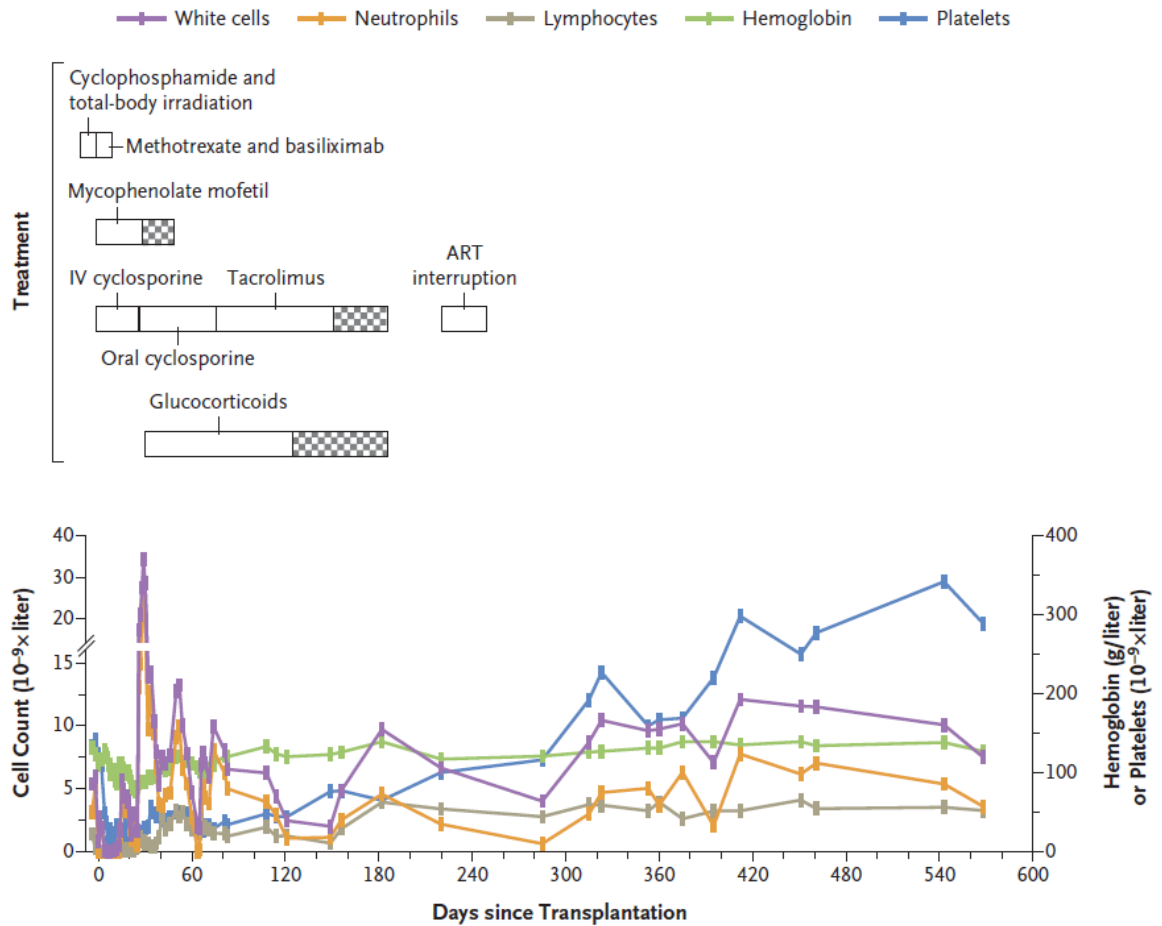
B Change in *CCR5* Modification Level in Bone Marrow

C *CCR5* Modification Levels at 19 Mo

Exercise 3

Suggest methods to remove oil (hydrocarbon) from seeds based on your understanding of rDNA technology and chemistry oil?

Dr. Selma Hamimed