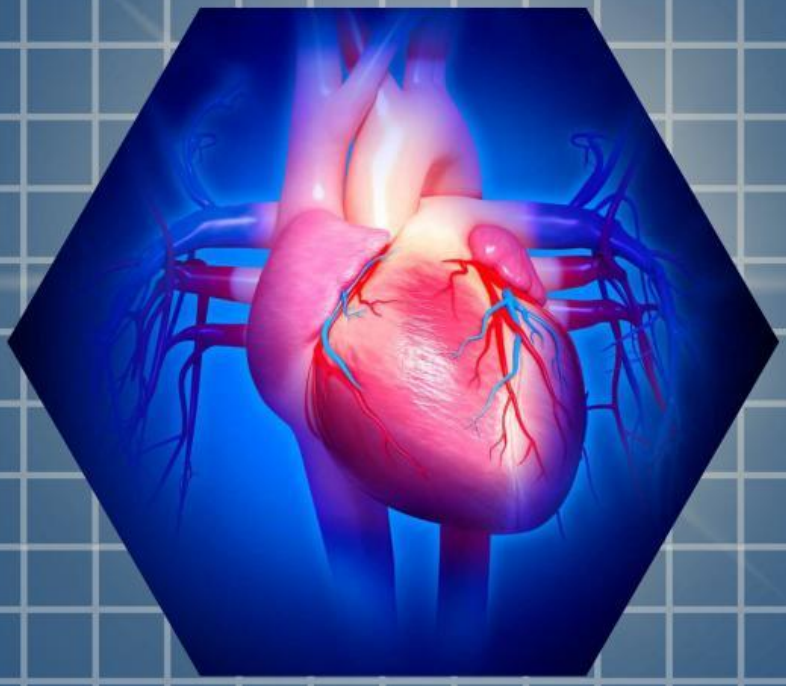
Kardiovascular Disease



Group :

Group Members :

1 _____

2 _____

3 _____

4 _____

5 _____

LIVEWORKSHEETS

A. Introduction

Questions	Expected Answer
What do you know about genetics?	
What diseases can be caused by genetic factors?	
Do you know about hypertension?	
What factors can cause a person to develop hypertension?	
Do you know that one of the causes of hypertension is exposure to aromatic chemical substances? Give the explanantion!	
What are the serious complications that can arise from uncontrolled high blood pressure?	

LIVEWORKSHEETS

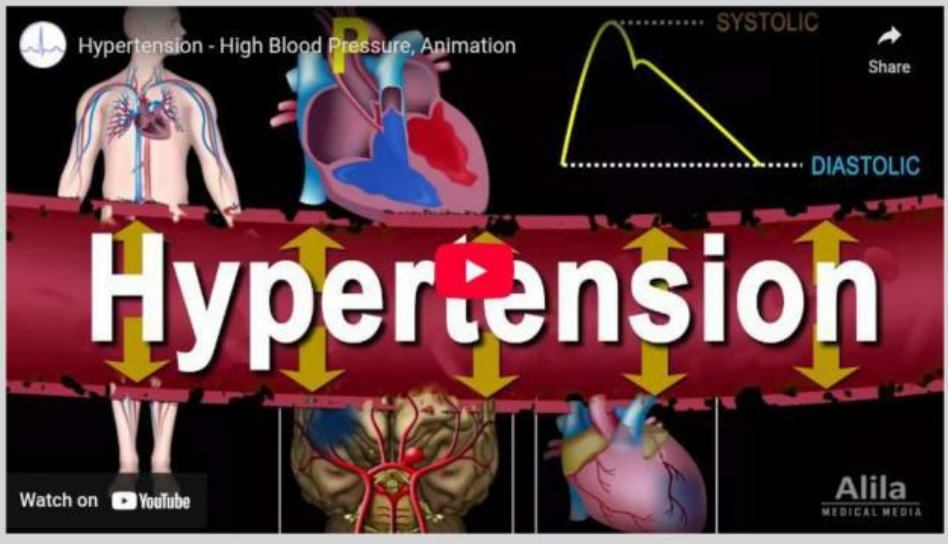
Now, let's watch a video genetics and hypertension

a). Genetics

https://youtu.be/v8tJGlicgp8?si=JlCn0P61yEz5JL8m

b). Hypertension

https://youtu.be/JtBtk00EiVM?si=W86YyjZsfpACfBYS



LIVEWORKSHEETS

B. Investigations

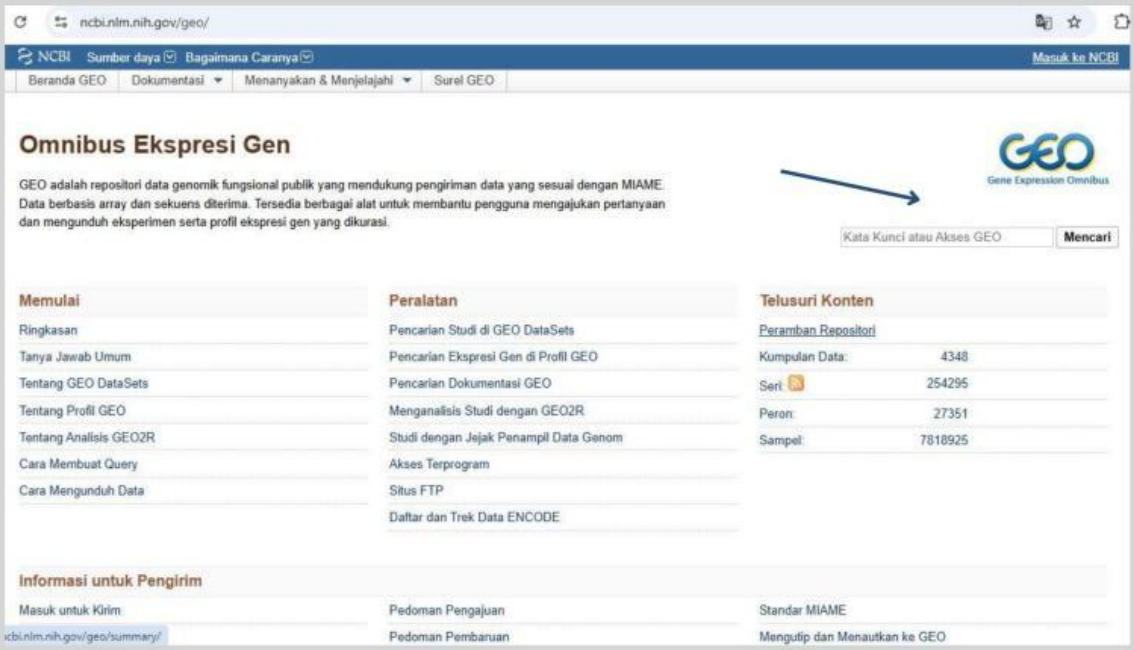
A 40-year-old woman who worked in the textile industry for 15 years complained of progressive shortness of breath, easy fatigue and swelling of the lower limbs. Her work history involved continuous exposure to aromatic amine chemicals used in the fabric dyeing process.

On physical examination, signs of pulmonary arterial hypertension (HAP) such as a loud second heart sound and enlarged jugular veins were found. Echocardiographic examination and right heart catheterization confirmed elevated pulmonary artery pressure (mPAP > 25 mmHg) with increased pulmonary vascular resistance.

Using GEO (Gene Expression Omnibus)

1. Access the NCBI GEO link: https://www.ncbi.nlm.nih.gov/geo/

2. Enter the keywords “Systems Analysis of the Human Pulmonary Arterial Hypertension Lung Transcriptome” in the 6search field.



3. Select the search result

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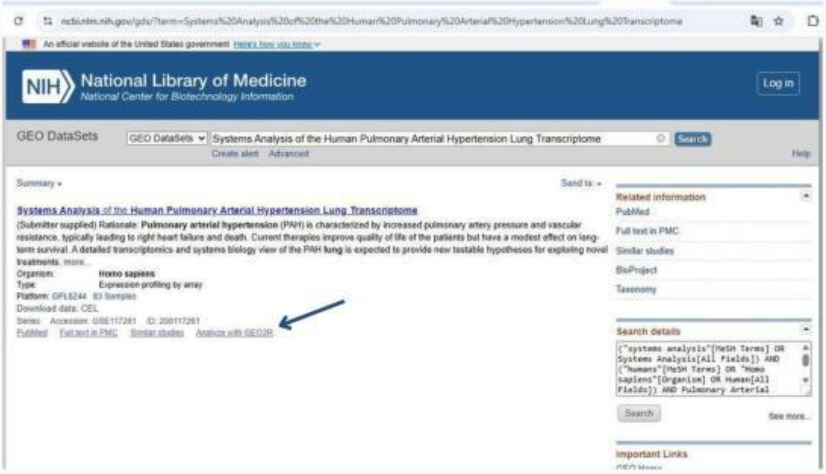
4. Click the “Analyze with GEO2R” button



5. Select “Define Groups”, then create 2 groups namely PAH and Control. The PAH group contains infected patients while the control group contains healthy patients.

6. Group each group by source name. “Lung_all PAH” is grouped in the PAH group, while “Lung_FD” is grouped in the control group.

7. After everything is grouped, the data is analyzed by clicking “Analyze”

8. Results can be seen in visualizations and tables.

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9. Note the following to be able to identify:

Column	Explanation
Gene.symbol	Gene name
logFC (log Fold Change)	Change value of gene expression. - Positive: gene up (overexpressed) - Negative: gene down (underexpressed)

To read the logFC consider the following criteria:

- logFC > 1 → Genes are expressed higher in the patient (e.g. proinflammatory genes).
- logFC < -1 → Genes are expressed lower in patients (e.g. protective genes such as vasodilators).

10. Analyse the results through the data from the table to determine the relationship between genes and cases. Analyse the data referring to the gene names viz: EDN1, PDGFB, BMPR2, NOS3. Analyse by reading the logFC according to the criteria in the previous point. Provide an explanation of the meaning of the logFC results of these genes by relating them to the case.

Fill in the column below based on the investigation results!

Gene	logFC	Gene Explanation
BMPR2		
EDN1		
NOS3		
PDGFB		

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Answer the questions below by linking to the previous answers!

1. What happens if the EDN1 gene is overexpressed in the lung?

2. Why is the BMPR2 gene important for keeping blood vessels healthy?

3. What happens if the NOS3 gene is decreased and the body lacks nitric oxide (NO)?

4. The PDGFB gene is increased in HAP patients. What do you think will happen if this gene makes the lung blood vessel walls thicker?

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Please answer the following questions again

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