Science & Technology · GS - III

Explain the biological mechanisms through which tobacco smoking increases the risk of lung cancer. Suggest measures to reduce the public health burden of tobacco-related diseases.

EXAM YEAR	PAPER	SUBJECT
DAILY PRACTICE 03/11/2026	GS - III	Science & Technology

MARKS	WORD LIMIT
10	~150 words

Answer Hint

Carcinogens in tobacco smoke; DNA mutations; impaired cellular repair; uncontrolled cell division; malignant tumours; tobacco control; public awareness; cessation support

Model Answer

Introduction

Tobacco smoking is a major preventable risk factor for lung cancer. Tobacco smoke contains numerous carcinogenic chemicals that can damage respiratory tissues and disrupt normal cellular functions.

Biological Mechanism

Carcinogens enter the lungs during inhalation and may damage the DNA of pulmonary cells. Mutations can accumulate when DNA repair mechanisms fail to correct the damage. Some affected cells may acquire the ability to divide uncontrollably, eventually forming malignant tumours that damage healthy lung tissue. The risk generally increases with prolonged exposure, although not every smoker develops lung cancer.

Public Health Measures

India should strengthen tobacco-control laws, enforce restrictions on tobacco advertising and smoking in public places, and improve awareness of tobacco-related diseases. Accessible cessation counselling and treatment can

help people quit smoking. Regular public health surveillance and targeted interventions can support prevention and early diagnosis.

Conclusion

Reducing tobacco consumption, preventing initiation among young people and expanding cessation support are essential to lowering lung cancer incidence and the wider burden of tobacco-related diseases.

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