Evaluation of Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) (Lab 3)

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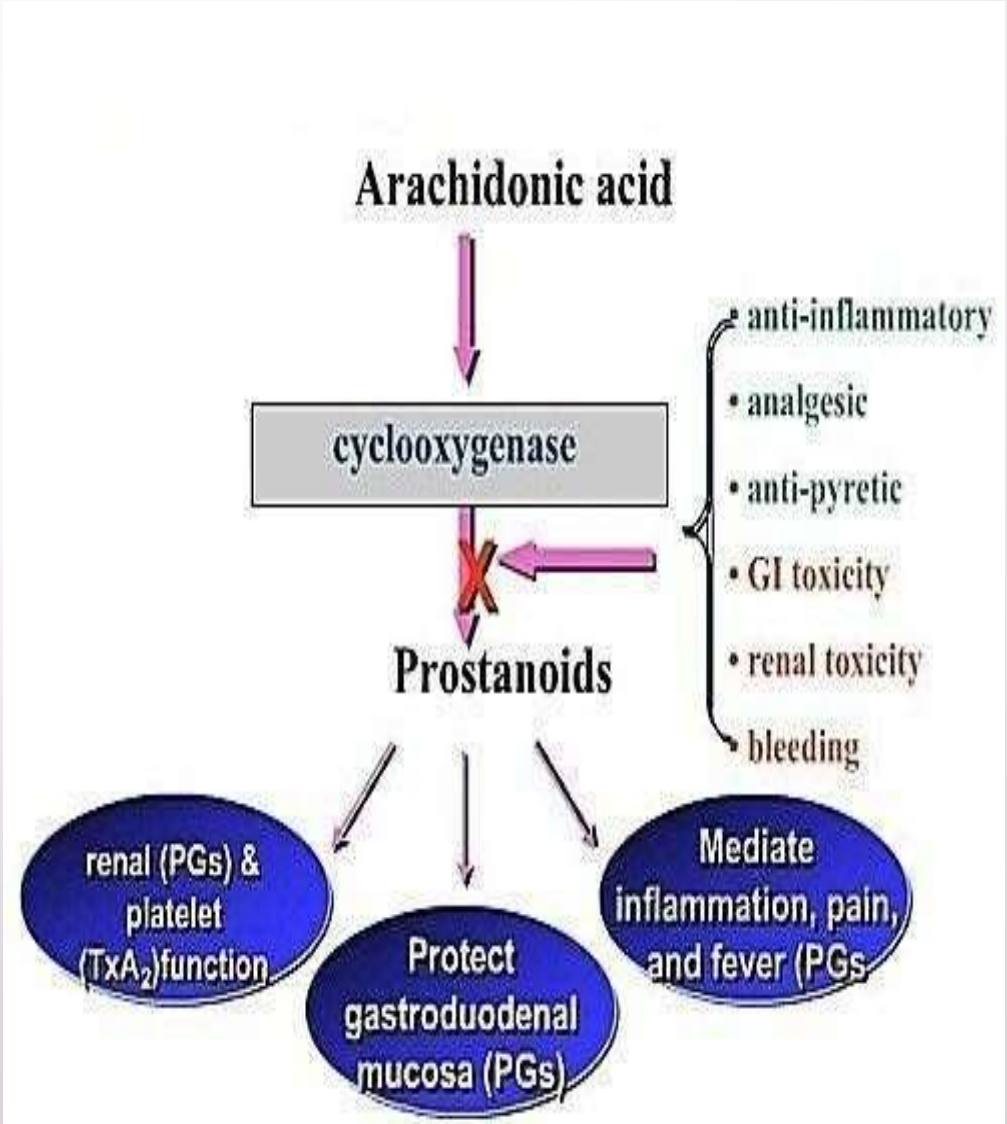
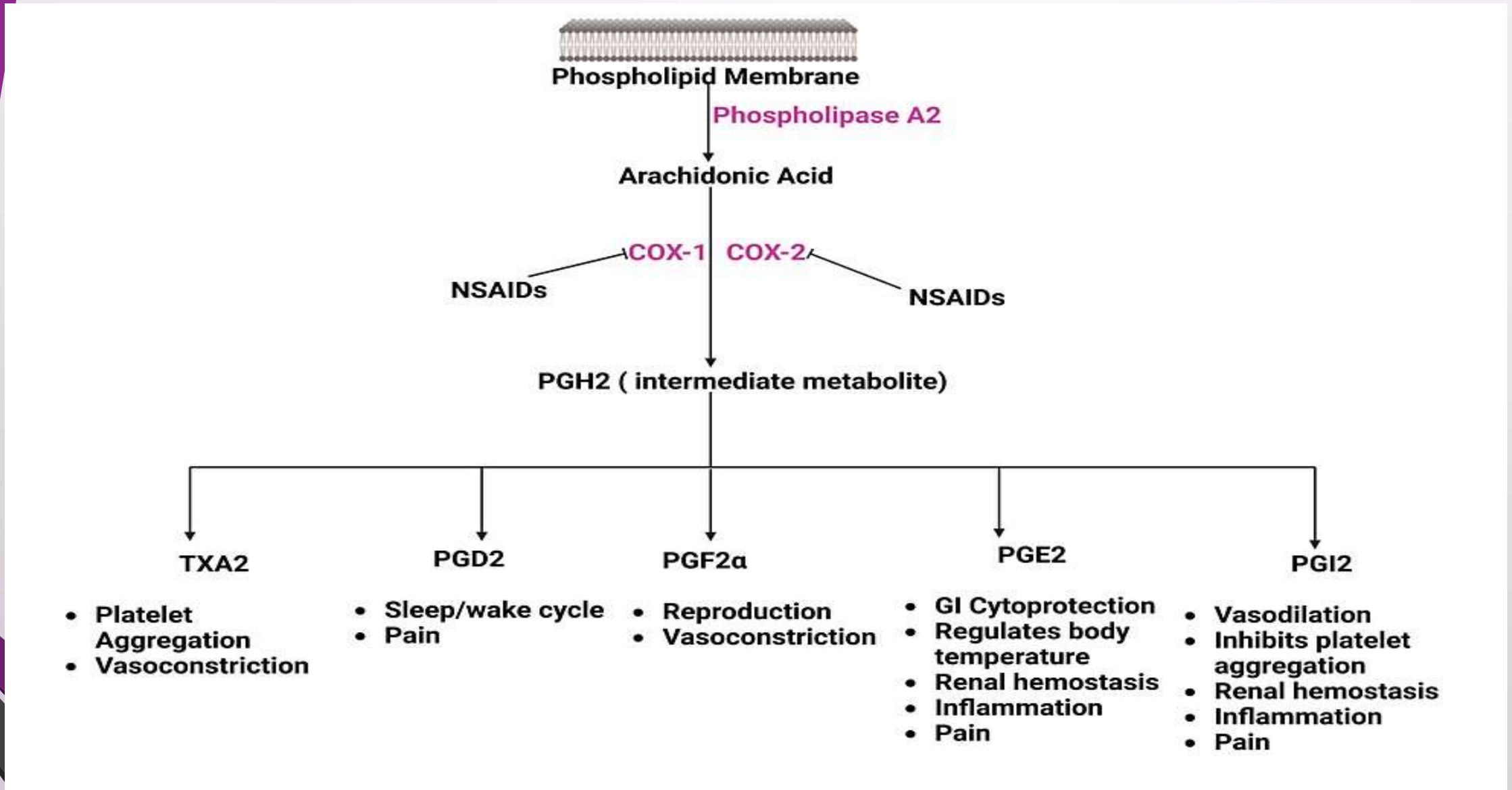
Nonsteroidal Anti-Inflammatory Drugs (NSAIDs):

•The **NSAIDs** are a group of drugs that differ in their **antipyretic**, **analgesic**, & **anti- inflammatory activities**.

•They act primarily by inhibiting the COX enzymes that catalyze the first step in prostanoid biosynthesis. This leads to decreased **prostaglandin** synthesis with both beneficial & unwanted effects.



Synthesis of prostaglandins



Clinical uses of NSAIDs

NSAIDs are used to relieve pain & reduce signs of inflammation.

NSAIDs are a common treatment for chronic health problems such as rheumatoid arthritis & osteoarthritis.

General Adverse Effects of NSAIDs:

•Dyspepsia, nausea & vomiting. Gastric damage may occur in chronic users, with risk of hemorrhage.

• Skin reactions.

•Reversible renal insufficiency seen mainly in individuals with compromised renal function.

•All NSAIDs (except COX-2 inhibitors) prevent platelet aggregation & therefore may prolong bleeding.

In vivo analgesic evaluation techniques:

❖ Principle:

Pain is induced in a suitable animal & the response of the animal to the painful stimuli is recorded with or without administration of the analgesic agent.

❖ Classification of methods:

1. Methods for central analgesic activity:

- Hot plate method
- Tail immersion method
- Tail clip method

2. Method for peripheral analgesic activity:

- Writhing method
- Formalin test in rats

Writhing method:

•The painful stimulus is induced by IP injection of an irritant substance (acetic acid)

•The animals create a characteristics stretching behavior, which is called writhing.

(writhing is constriction of abdomen, turning of trunk (twist) & extension of hind legs).

•The number of writhes for each animal is counted during certain time period (during 30 minutes), beginning 5 minutes after injection of acetic acid.

Experimental protocol:

Control group

•The control group is given acetic acid IP (10 ml/kg) & after 5 minutes the number of writhes is recorded for each animal during 20 minutes.

• The number of writhes is recorded

Treated group

•Treated animals are administered the drug (diclofenac sodium at dose 10 mg/kg) IP, 5 minutes prior to acetic acid administration. Then acetic acid is given IP.

•5 minutes are allowed to elapse, the mice are then observed for a period of 20 minutes & the number of writhes is recorded.

•If the drug possesses analgesic activity, the animal that received the drug will give lower number of writhes than the control, i.e. the drug having analgesic activity that inhibits writhing.

• **Calculate % inhibition:**

% inhibition = [No. of writhing in control group - No. of writhing in treated group] / No. of writhing in control group] × 100

Writhing test		
Group	**No. of writhing**	**% inhibition**
Control	**40**	**0**
Group I: Drug A	**20**	**50%**
Group II: Drug B	**30**	**25%**

THANK YOU FOR YOUR ATTENTION