SNS COLLEGE OF ALLIED HEALTH SCIENCE

SNS Kalvi Nagar, Coimbatore - 35

Affiliated to Dr MGR Medical University, Chennai

DEPARTMENT OF OPERATION THEATRE AND ANAESTHESIA TECHNOLOGY - II YEAR

COURSE NAME: PHARMACOLOGY

TOPIC - NSAIDS

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•NSAIDs are medications that reduce pain, inflammation, and fever without steroid-related risks.
•Act as analgesics, anti-inflammatories, and antipyretics.
•Used for arthritis, pain, and fever; not opioids or corticosteroids.

CLASSIFICATION

- Salicylates (e.g., Aspirin)
- Propionic Acids (e.g., Ibuprofen, Naproxen)
- Acetic Acids (e.g., Diclofenac, Indomethacin)
- Enolic Acids (Oxicams; e.g., Piroxicam, Meloxicam)
- Anthranilic Acids (Fenamates; e.g., Mefenamic Acid)
- Selective COX-2 Inhibitors (e.g., Celecoxib)

SALICYLATES (E.g., ASPIRIN)

•**Mechanism:** Irreversible COX-1/COX-2 inhibition; reduces prostaglandins/thromboxanes.

PharmacoKinetics:

•Metabolism: Hepatic

•Excretion: Renal

PharmacoDynamics:

Anti-inflammatory, analgesic, antipyretic; antiplatelet via thromboxane block.

•**Onset/Duration:** 30 min (pain); 4-6h duration; antiplatelet lasts 7-10 days.

•**Dosage:** 325-650mg q4-6h (pain; max 4g/day); 75-325mg daily (CV prevention).

•**Adverse Effects:** GI ulcers/bleeding, tinnitus, Reye's syndrome, renal impairment.

•**Indications:** Pain, fever, inflammation, CV prophylaxis, arthritis.

•**Interactions:** Bleeding risk with warfarin/SSRIs; reduces antihypertensives; alcohol increases GI risk.

Propionic Acids (e.g., Ibuprofen, Naproxen)

•**Mechanism:** Non-selective COX-1/COX-2 inhibition; reversible.

PharmacoKinetics:

•Metabolism: Hepatic

• Excretion: Renal (metabolites).

PharmacoDynamics:

Reduces prostaglandins for pain/inflammation relief.

•**Onset/Duration:** 30 min (pain); 4-8h (ibuprofen short; naproxen >10h long).

•**Dosage:** Ibuprofen: 200-800mg q6-8h (max 3.2g/day); Naproxen: 220-500mg q8-12h (max 1.5g short-term).

•**Adverse Effects:**

• GI irritation/bleeds, CV risks (less with naproxen), renal toxicity, hearing loss.

•**Indications:** Mild-moderate pain, arthritis, dysmenorrhea, fever.

•**Interactions:** Diuretic/lithium reduction; bleeding with warfarin; hypertension aggravation.

ACETIC ACIDS (E.G., DICLOFENAC, INDOMETHACIN)

•**Mechanism:** Non-selective COX inhibition; potent anti-inflammatory.

PharmacoKinetics :

• Metabolism: Hepatic

•Excretion: Renal/biliary.

PharmacoDynamics :

• Prostaglandin reduction; strong on inflammation.

•**Onset/Duration:** 30 min (pain); 4-6h.

•**Dosage:** Diclofenac: 50-100mg tablets; Indomethacin: 25-50mg q8-12h (max 200mg/day).

•**Adverse Effects:** High GI risk (ulcers), hepatotoxicity (diclofenac), renal failure, CV events.

•**Indications:** Arthritis, gout, postoperative pain, migraine.

•**Interactions:** Methotrexate toxicity; bleeding with anticoagulants; diuretic antagonism.

ENOLIC ACIDS (OXICAMS; E.G., PIROXICAM, MELOXICAM)

•**Mechanism:** Non-selective COX inhibition (meloxicam prefers COX-2).

PharmacoKinetics :

Metabolism: Hepatic

Excretion: Renal.

PharmacoDynamics :

•Long-acting anti-inflammatory via prostaglandin block.

•**Onset/Duration:** Slower onset; >10h (long half-life).

•**Dosage:** Piroxicam: 20mg daily; Meloxicam: 7.5-15mg daily.

•**Adverse Effects:** GI bleeds, renal issues, skin reactions; lower GI risk with meloxicam.

•**Indications:** Chronic arthritis, long-term pain management.

•**Interactions:** Warfarin bleeding; lithium retention; alcohol synergy on GI.

ANTHRANILIC ACIDS
(FENAMATES; E.G., MEFENAMIC ACID)

•**Mechanism:** Non-selective COX inhibition.

PharmacoKinetics :

•Metabolism: Hepatic;

• Excretion: Renal.

PharmacoDynamics :

•Analgesic/anti-inflammatory via prostaglandin reduction.

•**Onset/Duration:** 30 min; 4-6h.

•**Dosage:** 500mg initial, then 250mg q6h (max 7 days).

•**Adverse Effects:** GI upset, diarrhea, renal toxicity, hematologic issues.

•**Indications:** Dysmenorrhea, mild pain.

•**Interactions:** Anticoagulants (bleeding); antihypertensives reduction.

ELECTIVE COX-2 INHIBITORS (E.G., CELECOXIB)

- **Mechanism:** Selective COX-2 inhibition; spares COX-1 (less GI impact).
- **PK:** Absorption: GI (2-3h peak); Distribution: Protein-bound; Metabolism: Hepatic CYP2C9; Excretion: Fecal/renal.
- **PD:** Anti-inflammatory without platelet/GI effects.
- **Onset/Duration:** 1-2h; 12h.
- **Dosage:** 100-200mg q12-24h (max 400mg/day).
- **Adverse Effects:** CV risks (MI/stroke), renal issues; lower GI bleeds.
- **Indications:** Arthritis, pain in patients with GI risk.
- **Interactions:** Sulfonamide allergy; warfarin; fluconazole (CYP inhibition)

NSAID Class	Mechanism	Onset	Duration	Side Effects	Indications
Salicylates (Aspirin)	Irreversible COX-1/COX-2 inhibition	30 min	4-6h	GI bleeding, tinnitus, renal issues, Reye's syndrome	Pain, fever, arthritis, CV prophylaxis
Propionic Acids (Ibuprofen)	Non-selective COX inhibition	30 min	4-8h	GI upset, CV risk, renal dysfunction	Pain, arthritis, dysmenorrhea, fever
Acetic Acids (Diclofenac)	Non-selective COX inhibition	30 min	6-8h	GI bleeding, hepatotoxicity, CV risk	Arthritis, gout, migraines
Enolic Acids (Piroxicam)	Non-selective COX inhibition	30 min	12-24h	GI irritation, renal effects, CV risk	Chronic arthritis, pain
Fenamates (Mefenamic Acid)	Non-selective COX inhibition	30 min	6-8h	GI distress, diarrhea, renal issues	Dysmenorrhea, mild pain
COX-2 Selective (Celecoxib)	Selective COX-2 inhibition	30 min	12-24h	CV risk, renal effects, lower GI risk	Arthritis, pain in GI risk patients

THANK YOU