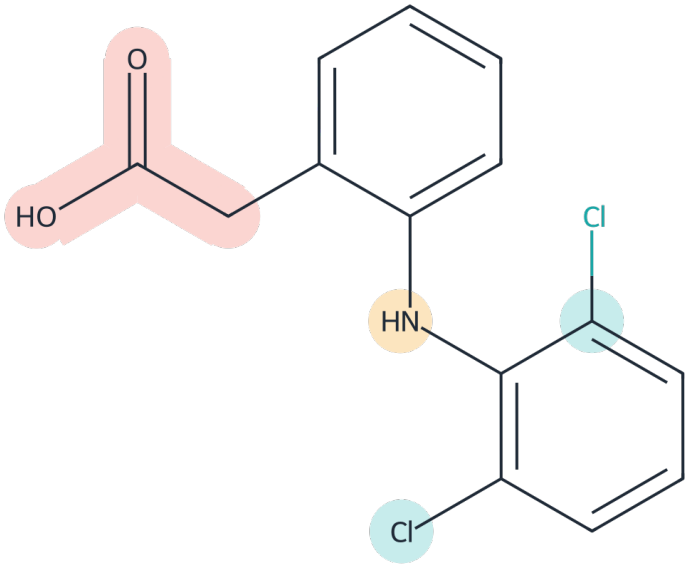
PATIENT-FRIENDLY GUIDE

Diclofenac

What it is, how it works, how to use it safely



Skeletal structure of diclofenac • $C_{14}H_{11}Cl_2NO_2$

One of the world’s most widely used anti-inflammatory medicines

Educational information only — not a substitute for advice from a doctor or pharmacist.

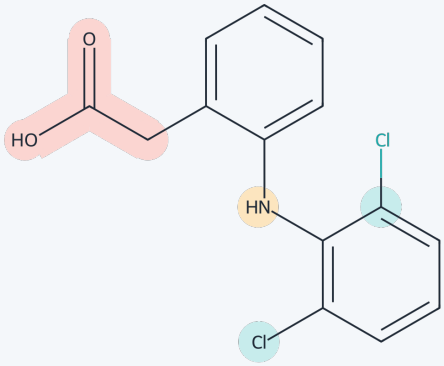
1 At a glance

The essentials in one minute

Diclofenac is a **non-steroidal anti-inflammatory drug (NSAID)**. It is used to reduce **pain, swelling and stiffness** in conditions such as arthritis, sprains and period pain. It comes in many forms — from tablets to gels and eye drops — and it is sold under many brand names around the world.

Drug class	NSAID (phenylacetic acid derivative)
Chemical formula	$C_{14}H_{11}Cl_2NO_2$
Molar mass	≈ 296.15 g/mol
Common brand names	Voltaren, Voltarol, Cataflam, Cambia, Flector, Zorvolex
Absorption	Oral bioavailability ≈ 50% (first-pass metabolism in the liver)
Half-life in blood	About 1–2 hours (effects in joints can last longer)
Availability	Prescription or over-the-counter, depending on country, strength and form

Anatomy of the molecule



● **Carboxylic acid group**
Gives diclofenac its acidic character; important for binding to the COX enzymes.

● **Secondary amine (NH)**
Links the two aromatic rings and helps the molecule take its twisted 3-D shape.

● **Two chlorine atoms**
They force the rings to twist, which helps the drug fit into the enzyme's channel. (The name hints at this: *di-chloro* + *phenyl* + *acetic acid*.)

A short history

1973 — Synthesised by Ciba-Geigy (Switzerland)

1974 — First launched (Japan) as Voltaren

1988 — Oral approval by the US FDA

2006 — Veterinary use banned in India, Nepal, Pakistan

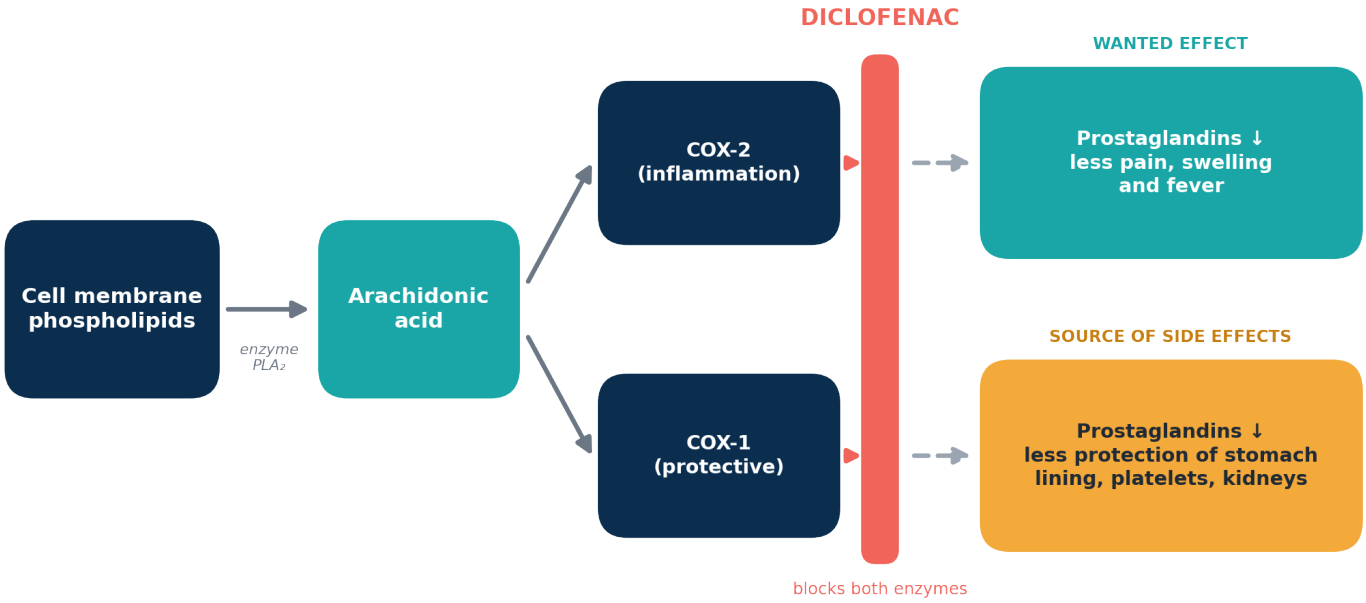
2007 — Topical gel approved in the US

2020 — Gel available without prescription in the US

2 How it works

Blocking the chemical messengers of pain and inflammation

When tissue is injured or inflamed, cells convert **arachidonic acid** into **prostaglandins** using enzymes called **cyclooxygenases (COX-1 and COX-2)**. Prostaglandins sensitise nerve endings to pain, widen blood vessels, cause swelling and raise body temperature. Diclofenac blocks both COX enzymes, so fewer prostaglandins are made.



1 Less pain

Fewer prostaglandins means nerve endings are less sensitive, so the same injury hurts less.

2 Less inflammation

Blood vessels leak less fluid into the tissue, which reduces swelling, redness and stiffness.

3 Lower fever

In the brain, lower prostaglandin levels reset the body's 'thermostat' toward normal.

Why the same action causes side effects

COX-1 also makes prostaglandins that **protect the stomach lining**, help **platelets** clot and keep **blood flowing to the kidneys**. Blocking it is what can lead to stomach irritation, bleeding risk and kidney strain. That is why the advice is always: **lowest effective dose, shortest possible time**.

A note on COX-2

Diclofenac is not perfectly balanced: laboratory studies show it blocks COX-2 somewhat more strongly than COX-1, similar to the 'coxib' drugs. This is one reason it is effective against inflammation — and also why heart and blood-vessel safety needs attention (see page 5).

Tablets vs. gel: where does the drug go?

Tablets and other oral forms

Absorbed from the gut, carried by the blood to the whole body. Strong effect, but every organ is exposed — stomach, heart, kidneys and liver included.

Gel, solution and patch

Pass through the skin into the tissue underneath, such as a knee joint. Much less enters the bloodstream, so whole-body side effects are generally lower, though not zero.

3 What it is used for

Common conditions and the forms it comes in

Osteoarthritis
Joint pain and stiffness caused by wear of cartilage, often in knees, hips and hands.

Rheumatoid arthritis
Long-term autoimmune joint inflammation; diclofenac eases symptoms but does not cure the disease.

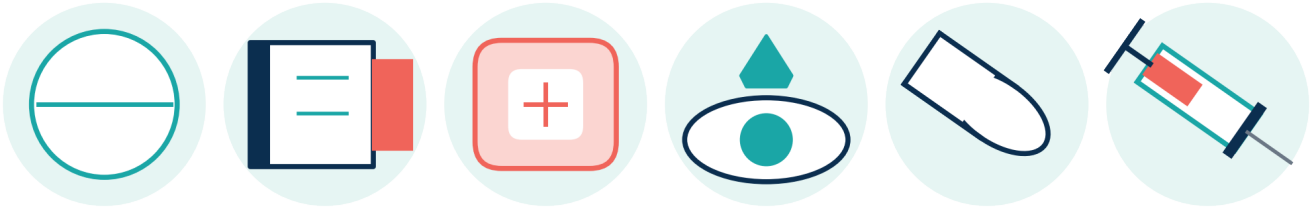
Ankylosing spondylitis
Inflammatory arthritis of the spine causing back pain and morning stiffness.

Injuries & acute pain
Sprains, strains, dental and post-operative pain, where swelling is part of the problem.

Migraine attacks
Special fast-absorbing formulations are used to treat an attack that has already started.

Period pain
Painful cramps (dysmenorrhea), because prostaglandins drive the uterine contractions.

Forms of diclofenac



Tablets | Topical gel | Skin patch | Eye drops | Suppository | Injection

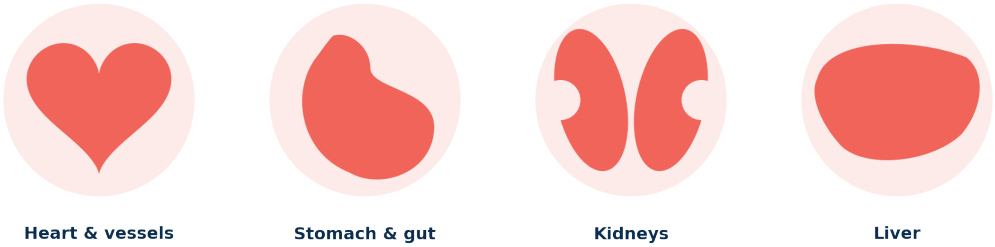
Form	Typically used for	Good to know
Delayed-release (enteric-coated) tablets	Arthritis and ongoing pain	Swallow whole; the coating releases the drug in the intestine, not the stomach.
Immediate-release tablets / powder	Acute pain, period pain, migraine	Absorbed faster and acts sooner, but wears off sooner.
Extended-release tablets	Steady all-day control of arthritis symptoms	Do not crush or chew — that releases the whole dose at once.
Gel, solution or patch	Localised pain, e.g. one knee or a sprained ankle	Only a small share reaches the bloodstream compared with tablets (around 6%). Avoid broken skin and strong sun on the area.
Eye drops	Inflammation after eye surgery	Used under the guidance of an eye specialist.
Suppositories and injections	When tablets are unsuitable or pain is severe	Rectal use, or injection given by a health professional.

Dose, timing and treatment length are individual. Always follow your doctor’s instructions or the product label — never exceed the stated amount.

4 Safety first

Side effects, warning signs and who needs extra care

Like all NSAIDs, diclofenac can affect several organs, especially at higher doses and with long-term use. The risks are usually low for short courses, but they are real — knowing the signs helps you act early.



Heart & vessels | Stomach & gut | Kidneys | Liver

Common, usually mild

- Heartburn, stomach pain, nausea
- Diarrhoea or constipation, bloating
- Headache or dizziness
- Mild fluid retention (swollen ankles)
- Raised liver enzymes on blood tests

Get urgent medical help if you notice

- **Black, tarry stools** or vomiting blood
- **Chest pain**, breathlessness, weakness on one side, slurred speech
- **Yellow skin or eyes**, very dark urine
- Swelling of face, lips or throat; **severe rash or blistering**
- Sudden weight gain or much less urine than usual

Who needs extra caution — talk to a doctor first

- History of **stomach ulcer or bleeding**, or Crohn’s disease / ulcerative colitis
- **Heart disease**, previous heart attack or stroke, poorly controlled high blood pressure (not for use around heart-bypass surgery)
- **Kidney or liver** problems, or heart failure
- Asthma that worsens with aspirin or other NSAIDs; known NSAID allergy
- **Pregnancy** (NSAIDs are generally avoided from about 20 weeks and in the third trimester) and breastfeeding
- Older adults, who are more sensitive to side effects

Medicines and substances that interact

Combined with…	Why it matters
Other NSAIDs, aspirin for pain	More stomach, kidney and heart risk with no extra benefit.
Blood thinners, SSRI antidepressants, steroids	Higher chance of stomach bleeding.
ACE inhibitors, ARBs, diuretics	Extra strain on the kidneys; blood-pressure drugs may work less well.
Lithium, methotrexate, ciclosporin	Blood levels of these drugs can rise to harmful levels.
Alcohol	Adds to stomach irritation and bleeding risk.

5 Using it wisely

Practical tips, surprising facts and quick answers

- **Take tablets with or right after food** unless the label says otherwise, with a full glass of water.
- **Swallow enteric-coated and extended-release tablets whole** — never crush or chew them.
- **Lowest dose, shortest time.** Stop and ask for advice if pain is not improving or you need it for more than a few days.
- **Don’t stack NSAIDs.** Check labels of cold, flu and pain products for ibuprofen, naproxen, aspirin or another diclofenac.
- **Gel:** apply a thin layer to clean, unbroken skin, wash hands afterwards, and avoid tight dressings and strong sun on the area.
- **Before surgery or dental work,** tell the team you take diclofenac — it can increase bleeding.
- **Stay hydrated,** especially in hot weather, illness or when you also take blood-pressure tablets.

Did you know?

95%+
decline in some South Asian vulture species after livestock were treated with diclofenac

~6%
roughly the share of a gel dose that reaches the bloodstream, compared with tablets

1973
year diclofenac was first synthesised — it is still among the most widely used NSAIDs worldwide

Vultures and veterinary use. Vultures that fed on carcasses of treated cattle suffered kidney failure. India, Pakistan and Nepal banned veterinary diclofenac in 2006, and conservation programmes continue to help populations recover.

Medicines in water. Small amounts pass through the body and wastewater plants into rivers. Diclofenac has been monitored under the EU’s water-quality watch list — a reminder to return unused medicines to a pharmacy rather than flush them.

Quick answers

Is diclofenac a steroid?	No. It is a non-steroidal anti-inflammatory drug, chemically unrelated to corticosteroids.
How is it different from ibuprofen?	Both are NSAIDs but different molecules. Some large analyses suggest diclofenac carries a higher heart-and-vessel risk than ibuprofen or naproxen at usual doses.
Can I take it every day for months?	Only if your doctor decides the benefit outweighs the risk and monitors you.
Can I drink alcohol with it?	It is best to avoid or strictly limit alcohol, which adds to stomach irritation.

Important notice

This guide is for general education only and does not replace professional medical advice, diagnosis or treatment. Product strengths, approvals and availability differ between countries. Ask your doctor or pharmacist about your own situation, and read the leaflet that comes with your medicine.