

## Pain



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**P**eople spend much of their lives trying to soothe physical pain. The global over-the-counter analgesics market was estimated to be worth just over US\$28 billion in 2022 and it is expected to grow to almost \$41 billion by 2032. At the same time, the massive overconsumption of pain-management opioid drugs, which can be addictive, continues to shatter lives.

Improving the treatment of pain requires a more nuanced understanding of what it means to feel it. Pain-o-meter devices are emerging that could finally bring precision and objectivity to every carer's first question: "where and how much does it hurt?" (see page S26). Researchers are also investigating whether biomarkers in brain scans and blood tests could predict which treatments will work in individuals, curtailing the long search for relief that many people with chronic pain experience (S28).

The pursuit of precision is made harder by the emerging realization that everyone experiences pain differently. Sex and gender account for some of this difference – women can be more sensitive to pain than are men (S31). They also find that their discomfort is more frequently ignored by health-care providers, and most animal studies of pain have used mainly male mice, helping to perpetuate inequity in pain management.

Several diseases that engender long-term pain are also disproportionately experienced by women – among them are endometriosis and fibromyalgia. But research linking chronic pain to the composition of the gut microbiome is raising hopes that manipulating these microbial communities could provide relief for some conditions (S34).

The opioid catastrophe still casts a dark shadow in parts of the world, and some pain researchers argue that new strategies are needed to accelerate the move away from these drugs (S40). In some instances, an escape from pain might not require a pharmaceutical breakthrough at all. Yoga, meditation, exercise and even virtual-reality experiences are proving effective for some who want to avoid – or have exhausted – conventional remedies (S37).

We are pleased to acknowledge the financial support of Pacira Biosciences Inc. in producing this Outlook. As always, *Nature* retains sole responsibility for all editorial content.

**Herb Brody**

Chief supplements editor

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The impact of pain is a personal experience.

Credit: Daniel Stolle for *Nature*

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