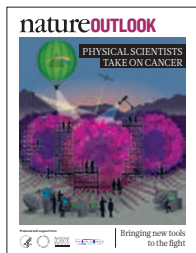


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PHYSICAL SCIENTISTS TAKE ON CANCER

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Despite a huge worldwide research effort, cancer's mortality rate has barely changed over the past few decades. But as we report in this Outlook, collaborations between biologists and physical scientists are bringing fresh perspectives that are starting to bear fruit.

Cancer research was a joint enterprise between physicists and life scientists until about 40 years ago, when the focus switched to the molecular, genetic and cellular aspects of the disease (page S50). Robert Gatenby argues that so much focus on the underlying genetics of cancer may be obscuring the bigger picture (S55). New research backs him up, and shows that cancer is not strictly a disease of genetic mutations — its development and spread are influenced by the physical forces exerted on cells (S56).

Computer modelling is providing a better understanding of the interplay between physical, genetic and cellular aspects of cancer (S62). Mathematical modelling leads to better predictions of how a tumour will evolve, and which drug regimens will be most effective (S66). And nanotechnology is yielding drug carriers that can transport chemotherapies to their targets more accurately (S58), and diagnostic tools to identify cancer at an earlier stage (S64). One start-up company that uses this diagnostic approach is Applied Proteomics, co-founded by a cancer biologist and a computer scientist (S52).

Until we unravel cancer's basic principles, the battle can only progress in inches, rather than in miles. According to oncologist David Agus and Nobel prizewinning physicist Murray Gell-Mann, such leaps forward require grand theories, an encouraging publishing environment and researchers willing to test big ideas (S61).

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Lauren Gravitz
Guest Editor

CONTENTS

S50 ONCOLOGY

Getting physical

Cancer research goes back to the future

S52 MEGADATA

The odd couple

Opposites attract to solve the protein problem

S55 PERSPECTIVE

Finding cancer's first principles

Robert Gatenby says genetic data just get in the way

S56 MECHANICS

The forces of cancer

Getting to grips with flexible cells

S58 NANOTECHNOLOGY

Carrying drugs

A little help with targeting therapies

S61 PERSPECTIVE

Meeting of minds

David Agus and Murray Gell-Mann find that two heads are better than one

S62 MODELLING

Computing cancer

A simulating experience

S64 DIAGNOSTICS

Playing detective

The clues to spotting cancer earlier

S66 MATHEMATICAL MODELLING

Forecasting cancer

One step ahead of evolution

COLLECTION

S68 Nanopore-based detection of circulating microRNAs in lung cancer patients

Yong Wang, Dali Zheng, Qiulin Tan, Michael X. Wang and Li-Qun Gu

S75 The nanomechanical signature of breast cancer

Marija Plodinec et al.

S84 Mechanical waves during tissue expansion

Xavier Serra-Picamal et al.

S91 The Cancer Cell Line Encyclopedia enables predictive modelling of anticancer drug sensitivity

Jordi Barretina et al.

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