

Blowing Harder

Climate change is often discussed in terms of ground surface air temperature, and less often in terms of precipitation, sea surface temperature, or any of the other parameters that constitute climate in its totality. Wind speed and its dependent variable, ocean wave height, are rarely considered. **Young *et al.*** (p. 451, published online 24 March) analyzed a 23-year-long database of wind speed and ocean wave heights to investigate how they may have changed. Windiness has been increasing on a global scale. However, the situation for waves is more complex: While wave heights in general show little statistically significant trends globally, the heights of larger waves do seem to be increasing at higher latitudes.

Binary Emissions

Black hole x-ray binaries consist of a black hole and a normal star that orbit around their common center of mass. Matter moving from the star toward the black hole produces bright x-ray emissions typical of these systems. **Laurent *et al.*** (p. 438, published online 24 March; see the Perspective by **Hardcastle**) report the detection of polarized gamma-ray photons from the black hole, Cygnus X-1. The polarized emission may be related to the jet of relativistic particles that is ejected from the vicinity of the black hole. This detection provides insight into the emission mechanisms in this source, which serves as a prototype for other black hole binaries.

Progranulin Protects

Rheumatoid arthritis is a systemic autoimmune disease that principally affects synovial joints, including knee, finger, hip, and wrist. The inflammatory cytokine, tumor necrosis factor- α (TNF α), contributes to disease pathogenesis and targeted therapies against TNF α are currently in use. Because the therapeutic efficacy and side effects of anti-TNF α treatments differ among patients, there is interest in discovering new therapies. **Tang *et al.*** (p. 478, published online 10 March; see the Perspective by **Wu and Siegel**) now report that the growth factor progranulin may represent

a potential therapeutic target in the treatment of rheumatoid arthritis. Progranulin binds directly to TNF receptors 1 and 2 and competes with TNF α for receptor binding. Progranulin deficiency protected against the development of inflammatory arthritis in multiple mouse models of the disease. Furthermore, an engineered protein composed of peptide fragments of progranulin retained TNF receptor binding, prevented the development of inflammatory arthritis in mouse models, and decreased the mouse disease symptoms when used therapeutically.

A Tight Squeeze

Cell size and the maximal length of the anaphase spindle vary greatly. How can small cells ensure that their short spindle efficiently separates long chromosomes? Similarly, the size of chromosomes can vary tremendously. Whether and how cells cope with enlarged chromosomes is also unclear. **Neurohr *et al.*** (p. 465, published online 10 March) report that a highly elongated chromosome resulting from the fusion of the two longest endogenous chromosomes segregates faithfully and does not affect mitotic progression, spindle size, or cellular viability. It seems that yeast cells detect the presence of long chromosomes and specifically induce their hypercon-

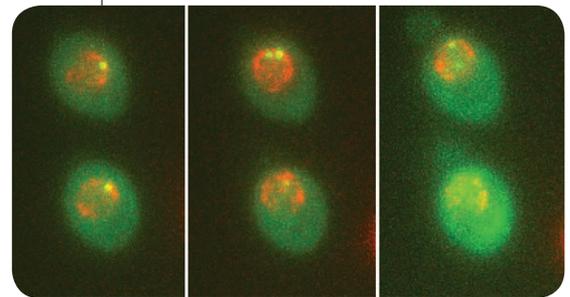
densation during anaphase. Thus, the spindle midzone may function as an anaphase “ruler,” to promote hypercondensation of long chromosomes and the scaling of their physical length relative to that of the spindle.

Ether Cleaver

Woody lignins may ultimately prove a useful source of raw material for chemical manufacturing, but producing individual molecular feedstocks from lignin remains a challenge. Lignin contains a network of aromatic hydrocarbons mostly connected through oxygen bonds, and methods to cleave these ether linkages tend to result in undesirable side reactions. **Sergeev and Hartwig** (p. 439) describe a homogeneous nickel catalyst that directs hydrogen to cleave aryl-oxygen bonds in lignin model compounds with high selectivity, leaving the carbon framework untouched, which provides a promising starting point for improved biomass processing.

Genes in Action

Genes are transcribed in a temporally discontinuous manner in a broad range of organisms (see the Perspective by **Nair and Raj**). **Suter *et al.*** (p. 472, published online 17 March) used a short-lived protein translated from short-lived



messenger RNA along with ultrasensitive bioluminescence microscopy to observe transcriptional kinetics of mammalian genes in individual cells. The size of transcriptional bursts, the duration of the silent interval, and the rate of switching transcription on and off all depended on the specific gene. Furthermore, the temporal pattern of transcription was markedly altered by modifications of gene promoter sequences. **Larson *et al.*** (p. 475) developed a light-microscopy method for observing transcription of single genes directly, allowing them to separate the different steps in RNA synthesis. Measurement of the *in vivo* dynamics of a yeast transcription factor indicated that the gene firing rate was directly determined by the search times for the transcription factor to find its target.