

References

Aktuell

CEVIK 2021

Muge Cevik & Stefan D. Baral, *Networks of SARS-CoV-2 transmission. science* **373** (2021), 162–163. DOI:10.1126/science.abg0842.

Individual and network heterogeneity should inform respiratory pandemic responses.

COHEN 2021

Jon Cohen, *Can immune responses predict which vaccines work best? science* **373** (2021), 142–143. DOI:10.1126/science.373.6551.142.

Elusive “correlates of protection” could lead to approvals of boosters or new vaccines without big clinical trials.

DOLGIN 2021

Elie Dolgin, *After Covid, is one vaccine dose enough? nature* **595** (2021), 161–162.

Previous coronavirus infection plus one dose of vaccine provides powerful protection—but concerns linger.

EDWARDS 2021

David A. Edwards & Chad J. Roy et al., *Exhaled aerosol increases with COVID-19 infection, age, and obesity. PNAS* **118** (2021), e2021830118. DOI:10.1073/pnas.2021830118.

pnas118-e2021830118-Comment.pdf, pnas118-e2021830118-Reply.pdf, pnas118-e2021830118-Supplement.pdf

COVID-19 transmits by droplets generated from surfaces of airway mucus during processes of respiration within hosts infected by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus. We studied respiratory droplet generation and exhalation in human and nonhuman primate subjects with and without COVID-19 infection to explore whether SARS-CoV-2 infection, and other changes in physiological state, translate into observable evolution of numbers and sizes of exhaled respiratory droplets in healthy and diseased subjects. In our observational cohort study of the exhaled breath particles of 194 healthy human subjects, and in our experimental infection study of eight nonhuman primates infected, by aerosol, with SARS-CoV-2, we found that exhaled aerosol particles vary between subjects by three orders of magnitude, with exhaled respiratory droplet number increasing with degree of COVID-19 infection and elevated BMI-years. We observed that 18% of human subjects (35) accounted for 80% of the exhaled bioaerosol of the group (194), reflecting a superspreader distribution of bioaerosol analogous to a classical 20:80 superspreader of infection distribution. These findings suggest that quantitative assessment and control of exhaled aerosol may be critical to slowing the airborne spread of COVID-19 in the absence of an effective and widely disseminated vaccine.

Keywords: aerosols | respiratory medicine | COVID-19 | superspreaders

David A. Edwards, Dennis Ausiello, Jonathan Salzman, Tom Devlin, Robert Langer, Brandon J. Beddingfield, Alyssa C. Fears, Lara A. Doyle-Meyers, Rachel K. Redmann, Stephanie Z. Killeen, Nicholas J. Maness & Chad J. Roy

Significance: Superspreading events have distinguished the COVID-19 pandemic from the early outbreak of the disease. Our studies of exhaled aerosol suggest that a critical factor in these and other transmission events is the propensity of certain individuals to exhale large numbers of small respiratory droplets. Our findings indicate that the capacity of airway lining mucus to resist breakup on breathing varies significantly between individuals, with a trend to increasing with the advance of COVID-19 infection and body mass index multiplied by age (i.e., BMI-years). Understanding the source and variance of respiratory droplet generation, and controlling it via the stabilization of airway lining mucus surfaces, may lead to effective approaches to reducing COVID-19 infection and transmission.

EDWARDS 2021

David A. Edwards, Jonathan Salzman & Robert Langer, *On the significance of BMI-age dependence of exhaled aerosol, Reply to Stohner*. [PNAS 118 \(2021\), e2107559118](#).

Our distinction, in the article, of two groups, superspreaders and low spreaders (of exhaled aerosol), is based on the observation that $\approx 20\%$ of the individuals exhaled $\approx 80\%$ of the aerosol—a classical superspreader distribution of airborne infectious disease (5). We believe the identification of the 20% highest aerosol-emitting individuals as a superemitting group is noteworthy in light of the present scientific debate (6) around the role exhaled respiratory droplets play in the spread of contagion.

JONES 2021

Terry C. Jones & Christian Drosten et al., *Estimating infectiousness throughout SARS-CoV-2 infection course*. [science 373 \(2021\), eabi5273](#). [DOI:10.1126/science.abi5273](#).

[s373-eabi5273-Supplement.pdf](#)

Two elementary parameters for quantifying viral infection and shedding are viral load and whether samples yield a replicating virus isolate in cell culture. We examined 25,381 cases of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in Germany, including 6110 from test centers attended by presymptomatic, asymptomatic, and mildly symptomatic (PAMS) subjects, 9519 who were hospitalized, and 1533 B.1.1.7 lineage infections. The viral load of the youngest subjects was lower than that of the older subjects by 0.5 (or fewer) log₁₀ units, and they displayed an estimated $\approx 78\%$ of the peak cell culture replication probability; in part this was due to smaller swab sizes and unlikely to be clinically relevant. Viral loads above 109 copies per swab were found in 8% of subjects, one-third of whom were PAMS, with a mean age of 37.6 years. We estimate 4.3 days from onset of shedding to peak viral load (108.1 RNA copies per swab) and peak cell culture isolation probability (0.75). B.1.1.7 subjects had mean log₁₀ viral load 1.05 higher than that of non-B.1.1.7 subjects, and the estimated cell culture replication probability of B.1.1.7 subjects was higher by a factor of 2.6.

Terry C. Jones, Guido Biele, Barbara Mühlemann, Talitha Veith, Julia Schneider, Jörn Beheim-Schwarzbach, Tobias Bleicker, Julia Tesch, Marie Luisa Schmidt, Leif Erik Sander, Florian Kurth, Peter Menzel, Rolf Schwarzer, Marta Zuchowski, Jörg Hofmann, Andi Krumbholz, Angela Stein, Anke Edelmann, Victor Max Corman & Christian Drosten

STOHNER 2021

Jürgen Stohner, *Does exhaled aerosol increase with COVID-19 infection correlate with body mass index-years?* [PNAS 118 \(2021\), e2106088118](#).

WADMAN 2021

Meredith Wadman, *Journal retracts paper claiming COVID-19 vaccines kill, Editors at Vaccines quit, protesting “irresponsible” study*. [science 373 \(2021\), 147](#). DOI:10.1126/science.373.6551.147.

The editors who resigned also feared the paper would feed antivaccine conspiracy theories. Days after it was published, Katie Ewer, an immunologist at the University of Oxford, wrote in an email to Science that the paper “is now being used by antivaxxers and COVID-19-deniers as evidence that COVID-19 vaccines are not safe. [This] is grossly irresponsible.

WILLYARD 2021

Cassandra Willyard, *The science behind school reopenings*. [nature 595 \(2021\), 164–167](#).

After a school term filled with anxiety and vitriol, researchers assess the spread of coronavirus and the prospects for a return to normal.

In the United States, however, surveys showed that families of colour didn’t necessarily want in-person schooling. When schools did open, these families were among those least willing to send their kids back. [...] And sending pupils back to in-person school wouldn’t fix the achievement gap. “In Baltimore City, Black students have been underperforming” for a long time, even before the pandemic, Brooks says.

Anthropologie

FINOCCHIO 2018

Andrea Finocchio & Andrea Novelletto et al., *A finely resolved phylogeny of Y chromosome Hg | illuminates the processes of Phoenician and Greek colonizations in the Mediterranean*. [Scientific Reports 8 \(2018\), 7465](#). DOI:10.1038/s41598-018-25912-9.

In order to improve the phylogeography of the male-specific genetic traces of Greek and Phoenician colonizations on the Northern coasts of the Mediterranean, we performed a geographically structured sampling of seven subclades of haplogroup | in Turkey, Greece and Italy. We resequenced 4.4 Mb of Y-chromosome in 58 subjects, obtaining 1079 high quality variants. We did not find a preferential coalescence of Turkish samples to ancestral nodes, contradicting the simplistic idea of a dispersal and radiation of Hg | as a whole from the Middle East. Upon calibration with an ancient Hg | chromosome, we confirmed that signs of Holocenic Hg | radiations are subtle and date mainly to the Bronze Age. We pinpointed seven variants which could potentially unveil star clusters of sequences, indicative of local expansions. By directly genotyping these variants in Hg | carriers and complementing with published resequenced chromosomes (893 subjects), we provide strong temporal and distributional evidence for markers of the Greek settlement of Magna Graecia (J2a-L397) and Phoenician migrations (rs760148062). Our work generated a minimal but robust list of evolutionarily stable markers to elucidate the demographic dynamics and spatial domains of male-mediated movements across and around the Mediterranean, in the last 6,000 years.

Andrea Finocchio, Beniamino Trombetta, Francesco Messina, Eugenia D'Atanasio, Nejat Akar, Aphrodite Loutradis, Emmanuel I. Michalodimitrakis, Fulvio Cruciani & Andrea Novelletto

Bibel

KROCHMALNIK 2007

Daniel Krochmalnik, *Variationen zum Anfang in der jüdischen Tradition*. [Zeitschrift für Ideengeschichte 1 \(2007\), ii, 45–61](#).

Im ersten Vers der Bibel wurde sicher nichts dem Zufall überlassen. Er besteht genau aus sieben Wörtern und kündigt damit thematisch die Schöpfungswoche an. Außerdem sind die ersten Wörter in den biblischen Büchern stets auch Titel und wohl auch entsprechend sorgfältig gewählt.

LEHMANN 2018

Gunnar Lehmann & Oz Varoner, *Early Iron Age Tombs in Northern Israel Revisited*. [Tel Aviv: Archaeology 45 \(2018\), 235–272](#).

This study defines early Iron Age burials in Northern Israel as a coherent assemblage with traditions that are archaeologically distinguishable from those of northern Phoenician and southern Philistine societies. These burial traditions are distinct from funerary customs of the Late Bronze Age and Iron IIB. The study discusses the main developments and regional differentiations of early Iron Age burial traditions with an emphasis on their chronological contexts.

Keywords: Early Iron Age | Burials | Early Iron Age pottery | Northern Israel

SITZ 2013

Stephanie Sitz, *Die Genesis in rabbinischer Auslegung und ihr Verhältnis zu anderen Schöpfungsmythen*. [historia.scribere 5 \(2013\), 373–394](#).

The following paper discusses the book of Genesis in its function as a creation myth in Jewish religion. It will turn its attention especially to the rabbinic interpretation of verses 1:1–3:24 and 6:5–9:19 and give a brief summary of its content. Furthermore the origin and dating of the book of Genesis itself and the rabbinic commentary, which is known as Bereshit Rabba, will be discussed. Concluding the Israelite creation myth will be compared to those from ancient oriental and Egyptian beliefs.

USSISHKIN 1973

David Ussishkin, *King Solomon's Palaces*. [Biblical Archaeologist 36 \(1973\), 78–105](#).

King Solomon's reign over Israel and Judah from approximately 970 to 930 B.C. was characterized by peace and great prosperity, and his kingdom stretched from the borders of Egypt to the Euphrates. This period forms a cornerstone in the archaeology of the Holy Land. On the one hand, long and detailed descriptions of Solomon's glorious reign and building activities appear in the Old Testament. On the other hand, substantial remains of the Solomonic period have been uncovered during the excavation of various sites in Israel; and much comparative material has been discovered in the neighboring countries. It is the existence of these two sources of information, the texts and the archaeological remains; which makes this period so fascinating in the study of biblical archaeology; for although these sources are based on different concepts, they are mutually dependent and combine to form a coherent picture.

Biologie

SUSAT 2021

Julian Susat, Harald Lübke, Almut Nebel & Ben Krause-Kyora et al., *A 5,000-year-old hunter-gatherer already plagued by Yersinia pestis*. [Cell Reports 35 \(2021\), 109278, 1–21](#).

In brief:

Susat et al. reconstruct the genome of a 5,000-year-old *Yersinia pestis* strain detected in a hunter-gatherer from Latvia. The results show that the basal lineages evolved already at the beginning of the Neolithic and had presumably limited infection potential, suggesting isolated zoonotic events as causative triggers.

Highlights:

- *Yersinia pestis* is discovered in a 5,000-year-old huntergatherer from Latvia
- *Y. pestis* emerged .7,000 years ago at the beginning of the Neolithic
- The infected individual might represent a case of septicemic plague due to zoonosis

Julian Susat, Harald Lübke, Alexander Immel, Ute Brinker, Aija Macāne, John Meadows, Britta Steer, Andreas Tholey, Ilga Zagorska, Guntis Gerhards, Ulrich Schmölcke, Mārcis Kalniņš, Andre Franke, Elīna Pētersone-Gordina, Barbara Teßman, Mari Tõrv, Stefan Schreiber, Christian Andree, Valdis Bērziņš, Almut Nebel & Ben Krause-Kyora

A 5,000-year-old *Yersinia pestis* genome (RV 2039) is reconstructed from a hunter-fisher-gatherer (5300–5050 cal BP) buried at Riné né ukalns, Latvia. RV 2039 is the first in a series of ancient strains that evolved shortly after the split of *Y. pestis* from its antecessor *Y. pseudotuberculosis* .7,000 years ago. The genomic and phylogenetic characteristics of RV 2039 are consistent with the hypothesis that this very early *Y. pestis* form was most likely less transmissible and maybe even less virulent than later strains. Our data do not support the scenario of a prehistoric pneumonic plague pandemic, as suggested previously for the Neolithic decline. The geographical and temporal distribution of the few prehistoric *Y. pestis* cases reported so far is more in agreement with single zoonotic events.

Energie

ANTONINI 2021

Enrico G. A. Antonini & Ken Caldeira, *Spatial constraints in large-scale expansion of wind power plants*. [PNAS 118 \(2021\), e2103875118](#).

[pnas118-e2103875118-Supplement.pdf](#)

When wind turbines are arranged in clusters, their performance is mutually affected, and their energy generation is reduced relative to what it would be if they were widely separated. Land-area power densities of small wind farms can exceed 10 W/m², and wakes are several rotor diameters in length. In contrast, large-scale wind farms have an upper-limit power density in the order of 1W/m² and wakes that can extend several tens of kilometers. Here, we address two important questions: 1) How large can a wind farm be before its generation reaches energy replenishment limits and 2) Howfar apart must large wind farms be spaced to avoid inter-wind-farm interference? We characterize controls on these spatial and temporal scales by running a set of idealized atmospheric simulations using the Weather and Research Forecasting model. Power generation and wind speed within and over the wind farm show that a timescale inversely proportional to the Coriolis parameter governs such transition, and the corresponding length scale is obtained by multiplying the timescale by the geostrophic wind speed. A

geostrophic wind of 8 m/s and a Coriolis parameter of 1.05×10^4 rad/s (latitude of $\approx 46^\circ$) would give a transitional scale of about 30 km. Wind farms smaller than this result in greater power densities and shorter wakes. Larger wind farms result instead in power densities that asymptotically reach their minimum and wakes that reach their maximum extent.

Keywords: wind energy | wind farm–atmosphere interaction | geophysical limits | spatial scales

Significance: Wind comprised 6.1 % of worldwide electricity generation in 2020. If this share is to substantially grow to decarbonize electricity systems, the size of future wind farms may extend far beyond that of current installations. The spatial scale of a wind farm affects both its mean generation per unit of land and the extension of wake shadowing on neighboring plants. As spatial scales increase, mean generation decreases and wake extension increases. Here, we characterize spatial constraints in the large-scale expansion of wind power plants to address the following: 1) How large a wind farm can be before its generation reaches energy replenishment limits, and 2) How far apart large wind farms must be spaced to avoid inter-windfarm interference.

BENNERT 1989

Wulf Bennert & Ulf-Jürgen Werner, *Windenergie*. (Berlin ²1991).

Judentum

KLAUSNER 1903

Joseph Klausner, *Die Messianischen Vorstellungen des jüdischen Volkes im Zeitalter der Tannaiten, kritisch untersucht und im Rahmen der Zeitgeschichte dargestellt*. Dissertation, Universität Heidelberg (Krakau 1903). Nachdruck von Leopold Classic Library.

KLAUSNER 1930

Joseph Klausner, *Jesus von Nazareth, Seine Zeit, sein Leben und seine Lehre*. (Berlin ³2021). Nachdruck der dritten erweiterten Auflage von 1952.

Metallzeiten

IALONGO 2021

Nicola Ialongo, Raphael Hermann & Lorenz Rahmstorf, *Bronze Age weight systems as a measure of market integration in Western Eurasia*. *PNAS* **118** (2021), e2105873118.

pnas118-e2105873118-Supplement1.xlsx, pnas118-e2105873118-Supplement2.xlsx, pnas118-e2105873118-Supplement3.xlsx, pnas118-e2105873118-Supplement4.xlsx

Weighing technology was invented around 3000 BCE between Mesopotamia and Egypt and became widely adopted in Western Eurasia within $\approx 2,000$ y. For the first time in history, merchants could rely on an objective frame of reference to quantify economic value. The subsequent emergence of different weight systems goes hand in hand with the formation of a continental market. However, we still do not know how the technological transmission happened and why different weight systems emerged along the way. Here, we show that the diffusion of weighing technology can be explained as the result of merchants' interaction and the emergence

of primary weight systems as the outcome of the random propagation of error constrained by market self-regulation. We found that the statistical errors of early units between Mesopotamia and Europe overlap significantly. Our experiment with replica weights gives error figures that are consistent with the archaeological sample. We used these figures to develop a model simulating the formation of primary weight systems based on the random propagation of error over time from a single original unit. The simulation is consistent with the observed distribution of weight units. We demonstrate that the creation of the earliest weight systems is not consistent with a substantial intervention of political authorities. Our results urge a reevaluation of the role of individual commercial initiatives in the formation of the first integrated market in Western Eurasia.

Keywords: Western Eurasia | Bronze Age | market integration | weight systems | trade

Significance: Increasing evidence shows that Bronze Age civilizations in Western Eurasia were economically interdependent for the procurement of essential raw materials. While this phenomenon hints at the possible formation of the first integrated market in history, recent models do not tackle its macroeconomic implications. Here, we address the customary regulation of weight systems as a measure of market integration. We show that Western Eurasian weight systems are consistent with the origin from a single unit. The information flow was efficient enough to regulate the statistical dispersion of weight systems on a continental scale, without any substantial intervention from political authorities. We argue that this suggests that the market had a concrete potential for an efficient reaction to price fluctuations.