Age and Aging

1- Age-related macular degeneration

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Abstract

Age-related macular degeneration (AMD) is the leading cause of legal blindness in the industrialized world. AMD is characterized by accumulation of extracellular deposits, namely drusen, along with progressive degeneration of photoreceptors and adjacent tissues. AMD is a multifactorial disease encompassing a complex interplay between ageing, environmental risk factors and genetic susceptibility. Chronic inflammation, lipid deposition, oxidative stress and impaired extracellular matrix maintenance are strongly implicated in AMD pathogenesis. However, the exact interactions of pathophysiological events that culminate in drusen formation and the associated degeneration processes remain to be elucidated. Despite tremendous advances in clinical care and in unravelling pathophysiological mechanisms, the unmet medical need related to AMD remains substantial. Although there have been major breakthroughs in the treatment of exudative AMD, no efficacious treatment is yet available to prevent progressive irreversible photoreceptor degeneration, which leads to central vision loss. Compelling progress in high-resolution retinal imaging has enabled refined phenotyping of AMD in vivo. These insights, in combination with clinicopathological and genetic correlations, have underscored the heterogeneity of AMD. Hence, our current understanding promotes the view that AMD represents a disease spectrum comprising

distinct phenotypes with different mechanisms of pathogenesis. Hence, tailoring therapeutics to specific phenotypes and stages may, in the future, be the key to preventing irreversible vision loss.
Age-related macular degeneration (AMD) is the leading cause of severe vision loss in the developed world. This Primer describes the different stages of AMD, its epidemiology, the current understanding of its pathophysiology and diagnostic modalities. Additionally, it outlines existing treatment options and highlights the outstanding issues, suggesting future research avenues.

Keywords
Keywords Plus
COMPLEMENT FACTOR-HOPTICAL COHERENCE TOMOGRAPHYRETINAL-PIGMENT EPITHELIUMQUALITY-OF-LIFEGEOGRAPHIC ATROPHY SECONDARYBRUCHS MEMBRANEGENETIC RISKMEDITERRANEAN DIETCHOROIDAL NEOVASCULARIZATIONCIGARETTE-SMOKING

2- Aging, Immunity, and COVID-19: How Age Influences the Host Immune Response to Coronavirus Infections?

By:
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Abstract

The novel coronavirus severe acute respiratory syndrome coronavirus 2 causing the Coronavirus disease (COVID-19) pandemic has ravaged the world with over 72 million total cases and over 1.6 million deaths worldwide as of early December 2020. An overwhelming preponderance of cases and deaths is observed within the elderly population, and especially in those with pre-existing conditions and comorbidities. Aging causes numerous biological changes in the immune system, which are linked to age-related illnesses and susceptibility to infectious diseases. Age-related changes influence the host immune response and therefore not only weaken the ability to fight respiratory infections but also to mount effective responses to vaccines. Immunosenescence and inflamm-aging are considered key features of the aging immune system wherein accumulation of senescent immune cells contribute to its decline and simultaneously increased inflammatory phenotypes cause immune dysfunction. Age-related quantitative and qualitative changes in the immune system affect cells and soluble mediators of both the innate and adaptive immune responses within lymphoid and non-lymphoid peripheral tissues. These changes determine not only the susceptibility to infections, but also disease progression and clinical outcomes thereafter. Furthermore, the response to therapeutics and the immune response to vaccines are influenced by age-related changes within the immune system. Therefore, better understanding of the pathophysiology of aging and the immune response will not only help understand age-related diseases but also guide targeted management strategies for deadly infectious diseases like COVID-19.

Keywords

Age and Aging

Author Keywords

agingimmunitycoronavirusSARS-CoVCOVID-19infectionimmune response

Keywords Plus

CONVERTING ENZYME 2T-CELLSLYMPHOCYTE SUBPOPULATIONSSARS CORONAVIRUSB LYMPHOPOIESISBONE-MARROWSYSTEMHOMEOSTASISIMMUNOSENESCENCEVACCINE

Age and Aging

3- Aging in COVID-19: Vulnerability, immunity and intervention

By:
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Abstract

The severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) pandemic was first reported in Wuhan, China in December 2019, moved across the globe at an unprecedented speed, and is having a profound and yet still unfolding health and socioeconomic impacts. SARS-CoV-2, a beta-coronavirus, is a highly contagious respiratory pathogen that causes a disease that has been termed the 2019 coronavirus disease (COVID-19). Clinical experience thus far indicates that COVID-19 is highly heterogeneous, ranging from being asymptomatic and mild to severe and causing death. Host factors including age, sex, and comorbid conditions are key determinants of disease severity and progression. Aging itself is a prominent risk factor for severe disease and death from COVID19. We hypothesize that age-related decline and dysregulation of immune function, i.e., immunosenescence and inflammaging play a major role in contributing to heightened vulnerability to severe COVID-19 outcomes in older adults. Much remains to be learned about the immune responses to SARS-CoV-2 infection. We need to begin partitioning all immunological outcome data by age to better understand disease heterogeneity and aging. Such knowledge is critical not only for understanding of COVID-19 pathogenesis but also for COVID-19 vaccine development.

Keywords
Author Keywords

Age and Aging

AgingCOVID-19SARS-CoV-2Cytokine stormImmunopathologyImmunosenescenceInflammagingAnti-IL-6 therapyVaccination

Keywords Plus

T-CELLSCORONAVIRUSVIRUSSARSCHINAINTERLEUKIN-6EPIDEMIOLOGYINFLAMMATIONPNEUMONIARESPONSES

Age and Aging

4- Cellular senescence in ageing: from mechanisms to therapeutic opportunities

By:
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Abstract

Cellular senescence, first described in vitro in 1961, has become a focus for biotech companies that target it to ameliorate a variety of human conditions. Eminently characterized by a permanent proliferation arrest, cellular senescence occurs in response to endogenous and exogenous stresses, including telomere dysfunction, oncogene activation and persistent DNA damage. Cellular senescence can also be a controlled programme occurring in diverse biological processes, including embryonic development. Senescent cell extrinsic activities, broadly related to the activation of a senescence-associated secretory phenotype, amplify the impact of cell-intrinsic proliferative arrest and contribute to impaired tissue regeneration, chronic age-associated diseases and organismal ageing. This Review discusses the mechanisms and modulators of cellular senescence establishment and induction of a senescence-associated secretory phenotype, and provides an overview of cellular senescence as an emerging opportunity to intervene through senolytic and senomorphic therapies in ageing and ageing-associated diseases.

Keywords

Age and Aging

Keywords Plus

DNA-DAMAGE-RESPONSEONCOGENE-INDUCED SENESCENCELEUKOCYTE TELOMERE LENGTHHEMATOPOIETIC STEM-CELLSSECRETORY PHENOTYPEDOUBLE-BLINDLIFE-SPANRHEUMATOID-ARTHRITISTUMOR SUPPRESSIONMITOCHONDRIAL DYSFUNCTION

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5- Protection against Covid-19 by BNT162b2 Booster across Age Groups

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Abstract

BACKGROUND
After promising initial results from the administration of a third (booster) dose of the BNT162b2 messenger RNA vaccine (Pfizer-BioNTech) to persons 60 years of age or older, the booster campaign in Israel was gradually expanded to persons in younger age groups who had received a second dose at least 5 months earlier.
METHODS
We extracted data for the period from July 30 to October 10, 2021, from the Israel Ministry of Health database regarding 4,696,865 persons 16 years of age or older who had received two doses of BNT162b2 at least 5 months earlier. In the primary analysis, we compared the rates of confirmed coronavirus disease 2019 (Covid-19), severe illness, and death among those who had received a booster dose at least 12 days earlier (booster group) with the rates among those who had not received a booster (nonbooster group). In a secondary analysis, we compared the rates in the booster group with the rates among those who had received a booster 3 to 7 days earlier (early postbooster group). We used Poisson regression models to estimate rate ratios after adjusting for possible confounding factors.

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RESULTS

The rate of confirmed infection was lower in the booster group than in the nonbooster group by a factor of approximately 10 (range across five age groups, 9.0 to 17.2) and was lower in the booster group than in the early postbooster group by a factor of 4.9 to 10.8. The adjusted rate difference ranged from 57.0 to 89.5 infections per 100,000 person-days in the primary analysis and from 34.4 to 38.3 in the secondary analysis. The rates of severe illness in the primary and secondary analyses were lower in the booster group by a factor of 17.9 (95% confidence interval [CI], 15.1 to 21.2) and 6.5 (95% CI, 5.1 to 8.2), respectively, among those 60 years of age or older and by a factor of 21.7 (95% CI, 10.6 to 44.2) and 3.7 (95% CI, 1.3 to 10.2) among those 40 to 59 years of age. The adjusted rate difference in the primary and secondary analyses was 5.4 and 1.9 cases of severe illness per 100,000 person-days among those 60 years of age or older and 0.6 and 0.1 among those 40 to 59 years of age. Among those 60 years of age or older, mortality was lower by a factor of 14.7 (95% CI, 10.0 to 21.4) in the primary analysis and 4.9 (95% CI, 3.1 to 7.9) in the secondary analysis. The adjusted rate difference in the primary and secondary analyses was 2.1 and 0.8 deaths per 100,000 person-days.

CONCLUSIONS

Across the age groups studied, rates of confirmed Covid-19 and severe illness were substantially lower among participants who received a booster dose of the BNT162b2 vaccine than among those who did not.

Keywords

Keywords Plus

VACCINEIMPACT

Age and Aging

6- Age-specific mortality and immunity patterns of SARS-CoV-2

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Abstract

Estimating the size of the coronavirus disease 2019 (COVID-19) pandemic and the infection severity of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is made challenging by inconsistencies in the available data. The number of deaths associated with COVID-19 is often used as a key indicator for the size of the epidemic, but the observed number of deaths represents only a minority of all infections(1,2). In addition, the heterogeneous burdens in nursing homes and the variable reporting of deaths of older individuals can hinder direct comparisons of mortality rates and the underlying levels of transmission across countries(3). Here we use age-specific COVID-19-associated death data from 45 countries and the results of 22 seroprevalence studies to investigate the consistency of infection and fatality patterns across multiple countries. We find that the age distribution of deaths in younger age groups (less than 65 years of age) is very consistent across different settings and demonstrate how these data can provide robust estimates of the share of the population that has been infected. We estimate that the infection fatality ratio is lowest among 5-9-year-old children, with a log-linear increase by age among individuals older than 30 years. Population age structures and heterogeneous burdens in nursing homes explain some but not all of the heterogeneity between countries in infection fatality ratios. Among the 45 countries included in our analysis, we estimate that approximately 5% of these populations had been infected by 1 September 2020, and that much higher transmission rates have probably occurred in a number of Latin American countries. This simple modelling framework can help countries to assess the progression of the pandemic and can be applied in any scenario for which reliable age-specific death data are available.

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The relative risk of COVID-19-associated death for younger individuals (under 65) is consistent across countries and can be used to robustly compare the underlying number of infections in each country.

Keywords
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Age and Aging

7- Age-related immune response heterogeneity to SARS-CoV-2 vaccine BNT162b2

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Collier, DA (Collier, Dami A.) [1] , [2] , [3] ; Ferreira, IATM (Ferreira, Isabella A. T. M.) [1] , [2] ; Kotagiri, P (Kotagiri, Prasanti) [1] , [2] ; Datir, RP (Datir, Rawlings P.) [1] , [2] , [3] ; Lim, EY (Lim, Eleanor Y.) [2] ; Touizer, E (Touizer, Emma) [3] ; Meng, B (Meng, Bo) [1] , [2] ; Abdullahi, A (Abdullahi, Adam) [1] ; Elmer, A (Elmer, Anne) [4] , [5] ; Kingston, N (Kingston, Nathalie) [4] , [5] ;
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Abstract

Although two-dose mRNA vaccination provides excellent protection against SARS-CoV-2, there is little information about vaccine efficacy against variants of concern (VOC) in individuals above eighty years of age(1). Here we analysed immune responses following vaccination with the BNT162b2 mRNA vaccine(2) in elderly participants and younger healthcare workers. Serum neutralization and levels of binding IgG or IgA after the first vaccine dose were lower in older individuals, with a marked drop in participants over eighty years old. Sera from participants above eighty showed lower neutralization potency against the B.1.1.7 (Alpha), B.1.351 (Beta) and P.1. (Gamma) VOC than against the wild-type virus and were more likely to lack any neutralization against VOC following the first dose. However, following the second dose, neutralization against VOC was detectable regardless of age. The frequency of SARS-CoV-2 spike-specific memory B cells was higher in elderly responders (whose serum showed neutralization activity) than in non-responders after the first dose. Elderly participants showed a clear reduction in somatic

hypermutation of class-switched cells. The production of interferon-gamma and interleukin-2 by SARS-CoV-2 spike-specific T cells was lower in older participants, and both cytokines were secreted primarily by CD4 T cells. We conclude that the elderly are a high-risk population and that specific measures to boost vaccine responses in this population are warranted, particularly where variants of concern are circulating.

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8- Feature Review Designing Future Crops: Genomics-Assisted Breeding Comes of Age

By:
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Abstract

Over the past decade, genomics-assisted breeding (GAB) has been instrumental in harnessing the potential of modern genome resources and characterizing and exploiting allelic variation for germplasm enhancement and cultivar development. Sustaining GAB in the future (GAB 2.0) will rely upon a suite of new approaches that fast-track targeted manipulation of allelic variation for creating novel diversity and facilitate their rapid and efficient incorporation in crop improvement programs. Genomic breeding strategies that optimize crop genomes with accumulation of beneficial alleles and purging of deleterious alleles will be indispensable for designing future crops. In coming decades, GAB 2.0 is expected to play a crucial role in breeding more climate-smart crop cultivars with higher nutritional value in a cost-effective and timely manner.

Keywords
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SNP GENOTYPING ARRAYWIDE ASSOCIATIONDELETERIOUS MUTATIONSNATURAL VARIATIONPROVIDE INSIGHTSRUST RESISTANCEGENE-EXPRESSIONBRASSICA-NAPUSPAN-GENOMERICE

Age and Aging

9- MARINE20-THE MARINE RADIOCARBON AGE CALIBRATION CURVE (0-55,000 CAL BP)

By:
Heaton, TJ (Heaton, Timothy J.) [1] ; Kohler, P (Koehler, Peter) [2] ; Butzin, M (Butzin, Martin) [2] ; Bard, E (Bard, Edouard) [3] ; Reimer, RW (Reimer, Ron W.) [4] ; Austin, WEN (Austin, William E. N.) [5] , [6] ; Ramsey, CB (Ramsey, Christopher Bronk) [7] ; Grootes, PM (Grootes, Pieter M.) [8] ; Hughen, KA (Hughen, Konrad A.) [9] ; Kromer, B (Kromer, Bernd) [10] ;
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Abstract

The concentration of radiocarbon (C-14) differs between ocean and atmosphere. Radiocarbon determinations from samples which obtained their C-14 in the marine environment therefore need a marine-specific calibration curve and cannot be calibrated directly against the atmospheric-based IntCal20 curve. This paper presents Marine20, an update to the internationally agreed marine radiocarbon age calibration curve that provides a non-polar global-average marine record of radiocarbon from 0-55 cal kBP and serves as a baseline for regional oceanic variation. Marine20 is intended for calibration of marine radiocarbon samples from non-polar regions; it is not suitable for calibration in polar regions where variability in sea ice extent, ocean upwelling and air-sea gas exchange may have caused larger changes to concentrations of marine radiocarbon. The Marine20 curve is based upon 500 simulations with an ocean/atmosphere/biosphere box-model of the global carbon cycle that has been forced by posterior realizations of our Northern Hemispheric atmospheric IntCal20 C-14 curve and reconstructed changes in CO2 obtained from ice core data. These forcings enable us to incorporate carbon cycle dynamics and temporal changes in the atmospheric C-14 level. The box-model simulations of the global-average marine radiocarbon reservoir age are similar to those of a more complex three-dimensional ocean general circulation model. However, simplicity and speed of the box model allow us to use a Monte Carlo approach

to rigorously propagate the uncertainty in both the historic concentration of atmospheric C-14 and other key parameters of the carbon cycle through to our final Marine20 calibration curve. This robust propagation of uncertainty is fundamental to providing reliable precision for the radiocarbon age calibration of marine based samples. We make a first step towards deconvolving the contributions of different processes to the total uncertainty; discuss the main differences of Marine20 from the previous age calibration curve Marine13; and identify the limitations of our approach together with key areas for further work. The updated values for Delta R, the regional marine radiocarbon reservoir age corrections required to calibrate against Marine20, can be found at the data base http://calib.org/marine/.

Keywords
Author Keywords
Bayesian modelingcalibrationcarbon cyclecomputer modelmarine environment
Keywords Plus
CARBON-DIOXIDE EXCHANGEU-TH AGESATMOSPHERIC CO2GAS-EXCHANGEWIND-SPEEDOCEAN BASINSTH-230 AGESC-14 AGESSEA-ICERESERVOIR

Age and Aging

10- THE INTCAL20 NORTHERN HEMISPHERE RADIOCARBON AGE CALIBRATION CURVE (0-55 CAL KBP)

By:
Reimer, PJ (Reimer, Paula J.) [1] ; Austin, WEN (Austin, William E. N.) [2] , [3] ; Bard, E (Bard, Edouard) [4] ; Bayliss, A (Bayliss, Alex) [5] ; Blackwell, PG (Blackwell, Paul G.) [6] ; Ramsey, CB (Ramsey, Christopher Bronk) [7] ; Butzin, M (Butzin, Martin) [8] ; Cheng, H (Cheng, Hai) [9] , [10] ; Edwards, RL (Edwards, R. Lawrence) [10] , [11] ; Friedrich, M (Friedrich, Michael) [12] ;
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Abstract

Radiocarbon (C-14) ages cannot provide absolutely dated chronologies for archaeological or paleoenvironmental studies directly but must be converted to calendar age equivalents using a calibration curve compensating for fluctuations in atmospheric C-14 concentration. Although calibration curves are constructed from independently dated archives, they invariably require revision as new data become available and our understanding of the Earth system improves. In this volume the international C-14 calibration curves for both the Northern and Southern Hemispheres, as well as for the ocean surface layer, have been updated to include a wealth of new data and extended to 55,000 cal BP. Based on tree rings, IntCal20 now extends as a fully atmospheric record to ca. 13,900 cal BP. For the older part of the timescale, IntCal20 comprises statistically integrated evidence from floating tree-ring chronologies, lacustrine and marine sediments, speleothems, and corals. We utilized improved evaluation of the timescales and location variable C-14 offsets from the atmosphere (reservoir age, dead carbon fraction) for each dataset. New statistical methods have refined the structure of the calibration curves while maintaining a robust treatment of uncertainties in the C-14 ages, the calendar ages and other corrections. The inclusion of modeled marine reservoir ages derived from a three-dimensional ocean circulation model has allowed us to apply more appropriate reservoir corrections to the marine C-14 data rather than the previous use of

constant regional offsets from the atmosphere. Here we provide an overview of the new and revised datasets and the associated methods used for the construction of the IntCal20 curve and explore potential regional offsets for tree-ring data. We discuss the main differences with respect to the previous calibration curve, IntCal13, and some of the implications for archaeology and geosciences ranging from the recent past to the time of the extinction of the Neanderthals.

Keywords
Author Keywords
calibration curveradiocarbonIntCal20
Keywords Plus
HIGH-RESOLUTION RECORDLAST GLACIAL PERIODGREENLAND ICE-COREANGLO-SAXON PERIODU-TH AGESC-14 CALIBRATIONTREE-RINGSNEW-ZEALANDHULU CAVEPLANKTONIC-FORAMINIFERA

Age and Aging

11- Brain energy rescue: an emerging therapeutic concept for neurodegenerative disorders of ageing

By:
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Abstract

Accumulating evidence indicates that impaired glucose metabolism in the brain is involved in the cause and progression of neurodegenerative disorders of ageing such as Alzheimer disease. This Review discusses the status and prospects of therapeutic strategies for countering neurodegenerative disorders of ageing by rescuing, protecting or normalizing brain energetics.

The brain requires a continuous supply of energy in the form of ATP, most of which is produced from glucose by oxidative phosphorylation in mitochondria, complemented by aerobic glycolysis in the cytoplasm. When glucose levels are limited, ketone bodies generated in the liver and lactate derived from exercising skeletal muscle can also become important energy substrates for the brain. In neurodegenerative disorders of ageing, brain glucose metabolism deteriorates in a progressive, region-specific and disease-specific manner - a problem that is best characterized in Alzheimer disease, where it begins presymptomatically. This Review discusses the status and prospects of therapeutic strategies for countering neurodegenerative disorders of ageing by improving, preserving or rescuing brain energetics. The approaches described include restoring oxidative phosphorylation and glycolysis, increasing insulin

sensitivity, correcting mitochondrial dysfunction, ketone-based interventions, acting via hormones that modulate cerebral energetics, RNA therapeutics and complementary multimodal lifestyle changes.

Keywords
Keywords Plus
TARGETED ANTIOXIDANT MITOQMILD COGNITIVE IMPAIRMENTMITOCHONDRIAL COMPLEX ITRANSGENIC MOUSE MODELALZHEIMERS-DISEASEKETOGENIC DIETBETA-HYDROXYBUTYRATEPARKINSONS-DISEASEGENE-EXPRESSIONDIABETIC-PATIENTS

Age and Aging

12- Age-dependent Immune Response to the Biontech/Pfizer BNT162b2 Coronavirus Disease 2019 Vaccination

By:
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Abstract

Background. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic has led to the development of various vaccines. Real-life data on immune responses elicited in the most vulnerable group of vaccinees older than age 80 years old are still underrepresented despite the prioritization of the elderly in vaccination campaigns.
Methods. We conducted a cohort study with 2 age groups, young vaccinees below the age of 60 years and elderly vaccinees over the age of 80 years, to compare their antibody responses to the first and second dose of the BNT162b2 coronavirus disease 2019 vaccination.
Results. Although the majority of participants in both groups produced specific immunoglobulin G antibody titers against SARS-CoV-2 spike protein, titers were significantly lower in elderly participants. Although the increment of antibody levels after the second immunization was higher in elderly participants, the absolute mean titer of this group remained lower than the <60 years of age group. After the second vaccination, 31.3% of the elderly had no detectable neutralizing antibodies in contrast to the younger group, in which only 2.2% had no detectable neutralizing antibodies.

Conclusions. Our data showed differences between the antibody responses raised after the first and second BNT162b2 vaccination, in particular lower frequencies of neutralizing antibodies in the elderly group. This suggests that this population needs to be closely monitored and may require earlier revaccination and/or an increased vaccine dose to ensure stronger long-lasting immunity and protection against infection.

Keywords
Author Keywords
SARS-CoV2COVID-19neutralizing antibodiesvaccinationhumoral responseimmunosenescence
Keywords Plus
INFLUENZA VACCINEINFECTIONCOVID-19EFFICACY

Age and Aging

13- Effectiveness of 2-Dose BNT162b2 (Pfizer BioNTech) mRNA Vaccine in Preventing SARS-CoV-2 Infection Among Children Aged 5-11 Years and Adolescents Aged 12-15 Years - PROTECT Cohort, July 2021-February 2022

By:
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Age and Aging

14- Adsorption of micropollutants onto realistic microplastics: Role of microplastic nature, size, age, and NOM fouling

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Abstract

This work aims at evaluating the role of nature, size, age, and natural organic matter (NOM) fouling of realistic microplastics (MPs) on the adsorption of two persistent micropollutants (diclofenac (DCF) and metronidazole (MNZ)). For such goal, four representative polymer types (polystyrene (PS), polyethylene terephthalate (PET), polypropylene (PP) and high-density polyethylene (HDPE)) were tested. MPs were obtained by cryogenic milling of different commercial materials (disposable bottles, containers, and trays), and fully characterized (optical microscopic and SEM images, FTIR, elemental analysis, water contact angle and pH(sl)(urry)). The micropollutants hydrophobicity determined to a high extent their removal yield from water. Regardless of the MP's nature, the adsorption capacity for DCF was considerably higher than the achieved for MNZ, which can be related to its stronger hydrophobic properties and aromatic character. In fact, aromatic MPs (PS and PET) showed the highest adsorption capacity values with DCF (similar to 100 mu g g(-1)). The MP size also played a key role on its adsorption capacity, which was found to increase with decreasing the particle size (20-1000 mu m). MPs aging (simulated by Fenton oxidation) led also to substantial changes on their sorption behavior. Oxidized MPs exhibited acidic surface properties which led to a strong decrease on the adsorption of the hydrophobic micropollutant (DCF) but to an increase with the hydrophilic one (MNZ). NOM fouling (WWTP effluent, river water, humic acid solution) led to a dramatic decrease on the MPs sorption capacity due to sorption

sites blocking. Finally, the increase of pH or salinity of the aqueous medium increased the micropollutants desorption.

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AdsorptionMicroplasticMicropollutantPolystyreneDiclofenacMetronidazole
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PERSONAL CARE PRODUCTSWASTE-WATERACTIVATED CARBONSORPTIONPHARMACEUTICALSREMOVALNANOPLASTICSANTIBIOTICSENVIRONMENTDICLOFENAC

Age and Aging

15- Age at onset of mental disorders worldwide: large-scale meta-analysis of 192 epidemiological studies

By:
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Abstract

Promotion of good mental health, prevention, and early intervention before/at the onset of mental disorders improve outcomes. However, the range and peak ages at onset for mental disorders are not fully established. To provide robust, global epidemiological estimates of age at onset for mental disorders, we conducted a PRISMA/MOOSE-compliant systematic review with meta-analysis of birth cohort/cross-sectional/cohort studies, representative of the general population, reporting age at onset for any ICD/DSM-mental disorders, identified in PubMed/Web of Science (up to 16/05/2020) (PROSPERO:CRD42019143015). Co-primary outcomes were the proportion of individuals with onset of mental disorders before age 14, 18, 25, and peak age at onset, for any mental disorder and across International Classification of Diseases 11 diagnostic blocks. Median age at onset of specific disorders was additionally investigated. Across 192 studies (n = 708,561) included, the proportion of individuals with onset of any mental disorders before the ages of 14, 18, 25 were 34.6%, 48.4%, 62.5%, and peak age was 14.5 years (k = 14, median = 18, interquartile range (IQR) = 11-34). For diagnostic blocks, the proportion of individuals with onset of disorder before the age of 14, 18, 25 and peak age were as follows:

neurodevelopmental disorders: 61.5%, 83.2%, 95.8%, 5.5 years (k = 21, median=12, IQR = 7-16), anxiety/fear-related disorders: 38.1%, 51.8%, 73.3%, 5.5 years (k = 73, median = 17, IQR = 9-25), obsessive-compulsive/related disorders: 24.6%, 45.1%, 64.0%, 14.5 years (k = 20, median = 19, IQR = 14-29), feeding/eating disorders/problems: 15.8%, 48.1%, 82.4%, 15.5 years (k = 11, median = 18, IQR = 15-23), conditions specifically associated with stress disorders: 16.9%, 27.6%, 43.1%, 15.5 years (k = 16, median = 30, IQR = 17-48), substance use disorders/addictive behaviours: 2.9%, 15.2%, 48.8%, 19.5 years (k = 58, median = 25, IQR = 20-41), schizophrenia-spectrum disorders/primary psychotic states: 3%, 12.3%, 47.8%, 20.5 years (k = 36, median = 25, IQR = 20-34), personality disorders/related traits: 1.9%, 9.6%, 47.7%, 20.5 years (k = 6, median = 25, IQR = 20-33), and mood disorders: 2.5%, 11.5%, 34.5%, 20.5 years (k = 79, median = 31, IQR = 21-46). No significant difference emerged by sex, or definition of age of onset. Median age at onset for specific mental disorders mapped on a time continuum, from phobias/separation anxiety/autism spectrum disorder/attention deficit hyperactivity disorder/social anxiety (8-13 years) to anorexia nervosa/bulimia nervosa/obsessive-compulsive/binge eating/cannabis use disorders (17-22 years), followed by schizophrenia, personality, panic and alcohol use disorders (25-27 years), and finally post-traumatic/depressive/generalized anxiety/bipolar/acute and transient psychotic disorders (30-35 years), with overlap among groups and no significant clustering. These results inform the timing of good mental health promotion/preventive/early intervention, updating the current mental health system structured around a child/adult service schism at age 18.

Keywords
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SOUTH-LONDON OASISRISK-FACTORSYOUNG-PEOPLEPSYCHOSISSCHIZOPHRENIAHEALTHPSYCHIATRYDEPRESSIONMORTALITYOUTREACH

Age and Aging

16- Evaluation of the BNT162b2 Covid-19 Vaccine in Children 5 to 11 Years of Age

By:
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Abstract

BACKGROUND
Safe, effective vaccines against coronavirus disease 2019 (Covid-19) are urgently needed in children younger than 12 years of age.
METHODS
A phase 1, dose-finding study and an ongoing phase 2-3 randomized trial are being conducted to investigate the safety, immunogenicity, and efficacy of two doses of the BNT162b2 vaccine administered 21 days apart in children 6 months to 11 years of age. We present results for 5-to-11-year-old children. In the phase 2-3 trial, participants were randomly assigned in a 2:1 ratio to receive two doses of either the BNT162b2 vaccine at the dose level identified during the open-label phase 1 study or placebo. Immune responses 1 month after the second dose of BNT162b2 were immunologically bridged to those in 16-to-

25-year-olds from the pivotal trial of two 30-mu g doses of BNT162b2. Vaccine efficacy against Covid-19 at 7 days or more after the second dose was assessed.
RESULTS
During the phase 1 study, a total of 48 children 5 to 11 years of age received 10 mu g, 20 mu g, or 30 mu g of the BNT162b2 vaccine (16 children at each dose level). On the basis of reactogenicity and immunogenicity, a dose level of 10 ktg was selected for further study. In the phase 2-3 trial, a total of 2268 children were randomly assigned to receive the BNT162b2 vaccine (1517 children) or placebo (751 children). At data cutoff, the median follow-up was 2.3 months. In the 5-to-11-year-olds, as in other age groups, the BNT162b2 vaccine had a favorable safety profile. No vaccine-related serious adverse events were noted. One month after the second dose, the geometric mean ratio of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) neutralizing titers in 5-to-11-year-olds to those in 16-to-25-year-olds was 1.04 (95% confidence interval [CI), 0.93 to 1.18), a ratio meeting the prespecified immunogenicity success criterion (lower bound of two-sided 95% CI, >0.67; geometric mean ratio point estimate, >= 0.8). Covid-19 with onset 7 days or more after the second dose was reported in three recipients of the BNT162b2 vaccine and in 16 placebo recipients (vaccine efficacy, 90.7%; 95% CI, 67.7 to 98.3).
CONCLUSIONS
A Covid-19 vaccination regimen consisting of two 10-mu g doses of BNT162b2 administered 21 days apart was found to be safe, immunogenic, and efficacious in children 5 to 11 years of age.

17- Aging mechanism of microplastics with UV irradiation and its effects on the adsorption of heavy metals

By:
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Abstract

Microplastics are formed by the degradation of plastic wastes under the action of physicochemical mechanisms in environment, and they are becoming a new type of pollutant that is attractings global attention. However, research on the aging characteristics and mechanism of microplastics is limited. The aging mechanism of Polystyrene (PS) with UV irradiation under different conditions (air, pure water and seawater) and the effect of aging on heavy metal adsorption were studied. The results show that PS have different characteristics with UV irradiation under different conditions, and the aging of PS is the most obvious in air. Based on the 2D-COS analysis, different aging mechanisms were identified under different aging conditions, aging sequence of aged PS functional groups in air and water were clearly definited. An isothermal adsorption model shows that aging can significantly increase the adsorption of heavy metals by PS. The adsorption of heavy metals is also affected by different aging methods. Over all, a 2D-COS analysis was an effective method for understanding the aging process of PS. These results further clarify the aging mechanism of PS, and provides a theoretical basis for the assessment of environmental behavior and ecological risk when microplastics and heavy metals coexist.

Keywords
Author Keywords
MicroplasticsUV irradiation2D-COSAdsorptionHeavy metal
Keywords Plus
CORRELATION SPECTROSCOPIC ANALYSISPLASTIC PRODUCTION PELLETSPHOTOCATALYTIC DEGRADATIONMARINE-ENVIRONMENTTRACE-METALSHUMIC ACIDSPOLYSTYRENESORPTIONIMPACTTIO2

Age and Aging

18- Illness duration and symptom profile in symptomatic UK school-aged children tested for SARS-CoV-2

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Abstract
Background In children, SARS-CoV-2 infection is usually asymptomatic or causes a mild illness of short duration. Persistent illness has been reported; however, its prevalence and characteristics are unclear. We aimed to determine illness duration and characteristics in symptomatic UK school-aged children tested for SARS-CoV-2 using data from the COVID Symptom Study, one of the largest UK citizen participatory epidemiological studies to date.
Methods In this prospective cohort study, data from UK school-aged children (age 5-17 years) were reported by an adult proxy. Participants were voluntary, and used a mobile application (app) launched jointly by Zoe Limited and King's College London. Illness duration and symptom prevalence, duration, and burden were analysed for children testing positive for SARS-CoV-2 for whom illness duration could be determined, and were assessed overall and for younger (age 5-11 years) and older (age 12-17 years) groups. Children with longer than 1 week between symptomatic reports on the app were excluded from analysis. Data from symptomatic children testing negative for SARS-CoV-2, matched 1:1 for age, gender, and week of testing, were also assessed.

Age and Aging

Findings 258 790 children aged 5-17 years were reported by an adult proxy between March 24, 2020, and Feb 22, 2021, of whom 75 529 had valid test results for SARS-CoV-2. 1734 children (588 younger and 1146 older children) had a positive SARS-CoV-2 test result and calculable illness duration within the study timeframe (illness onset between Sept 1, 2020, and Jan 24, 2021). The most common symptoms were headache (1079 [62.2%] of 1734 children), and fatigue (954 [55.0%] of 1734 children). Median illness duration was 6 days (IQR 3-11) versus 3 days (2-7) in children testing negative, and was positively associated with age (Spearman's rank-order r(s) 0.19, p<0.0001). Median illness duration was longer for older children (7 days, IQR 3-12) than younger children (5 days, 2-9). 77 (4.4%) of 1734 children had illness duration of at least 28 days, more commonly in older than younger children (59 [5.1%] of 1146 older children vs 18 [3.1%] of 588 younger children; p=0.046). The commonest symptoms experienced by these children during the first 4 weeks of illness were fatigue (65 [84.4%] of 77), headache (60 [77.9%] of 77), and anosmia (60 [77.9%] of 77); however, after day 28 the symptom burden was low (median 2 symptoms, IQR 1-4) compared with the first week of illness (median 6 symptoms, 4-8). Only 25 (1.8%) of 1379 children experienced symptoms for at least 56 days. Few children (15 children, 0.9%) in the negatively tested cohort had symptoms for at least 28 days; however, these children experienced greater symptom burden throughout their illness (9 symptoms, IQR 7.7-11.0 vs 8, 6-9) and after day 28 (5 symptoms, IQR 1.5-6.5 vs 2, 1-4) than did children who tested positive for SARS-CoV-2.
Interpretation Although COVID-19 in children is usually of short duration with low symptom burden, some children with COVID-19 experience prolonged illness duration. Reassuringly, symptom burden in these children did not increase with time, and most recovered by day 56. Some children who tested negative for SARS-CoV-2 also had persistent and burdensome illness. A holistic approach for all children with persistent illness during the pandemic is appropriate. Copyright (C) 2021 The Author(s). Published by Elsevier Ltd.

Keywords
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PREVALENCEINFECTIONHEADACHEMIGRAINEFATIGUE

Age and Aging

19- Archway Randomized Phase 3 Trial of the Port Delivery System with Ranibizumab for Neovascular Age-Related Macular Degeneration

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Abstract

Purpose: To evaluate the safety and efficacy of the Port Delivery System with ranibizumab (PDS) for the treatment of neovascular age-related macular degeneration (nAMD). Design: Phase 3, open-label, randomized, visual acuity assessor-masked noninferiority and equivalence trial. Participants: Patients with nAMD diagnosed within 9 months of screening previously treated with and responsive to anti-vascular endothelial growth factor therapy. Methods: Patients were randomized 3:2 to treatment with the PDS with ranibizumab 100 mg/ml with fixed 24-week (Q24W) refill-exchanges (PDS Q24W) or intravitreal ranibizumab 0.5-mg injections every 4 weeks (monthly ranibizumab). Main Outcome Measures: Primary end point was change in best-corrected visual acuity (BCVA) Early Treatment Diabetic Retinopathy Study letter (letters) score from baseline averaged over weeks 36 and 40 (noninferiority margin,-4.5 letters; equivalence margin, +/- 4.5 letters). Results: Archway enrolled 418 patients; 251 were randomized to and 248 received treatment with the PDS Q24W, and 167 were randomized to and received treatment with monthly ranibizumab. Baseline BCVA was 74.4 letters (PDS Q24W arm) and 75.5 letters (monthly ranibizumab arm; Snellen equivalent, 20/32). Adjusted mean change in BCVA score from baseline

averaged over weeks 36 and 40 was +0.2 letters (standard error [SE], 0.5 letters) in the PDS Q24W arm and +0.5 letters (SE, 0.6 letters) in the monthly ranibizumab arm (difference,-0.3 letters; 95% confidence interval,-1.7 to 1.1 letters). PDS Q24W was both noninferior and equivalent to monthly ranibizumab. Of 246 PDS-treated patients assessed for supplemental ranibizumab treatment, 242 (98.4%) did not receive supplemental ranibizumab treatment before the first refill-exchange procedure, including 4 patients who discontinued treatment before the first refill-exchange procedure. Prespecified ocular adverse events of special interest were reported in 47 patients (19.0%) in the PDS Q24W arm and 10 patients (6.0%) in the monthly ranibizumab arm, which included, in the former arm, 4 (1.6%) endophthalmitis cases, 2 (0.8%) retinal detachments, 13 (5.2%) vitreous hemorrhages, 6 (2.4%) conjunctival erosions, and 5 (2.0%) conjunctival retractions. Most ocular adverse events in the PDS Q24W arm occurred within 1 month of implantation. Conclusions: Archway met its primary objective and PDS Q24W demonstrated noninferior and equivalent efficacy to monthly ranibizumab, with 98.4% of PDS-treated patients not receiving supplemental treatment in the first 24-week interval. Ophthalmology 2022;129:295-307 (c) 2021 by the American Academy of Ophthalmology. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

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Age-related macular degenerationLong-acting drug deliveryOcular implantSustained releaseVascular endothelial growth factor
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REAL-WORLD OUTCOMESVISUAL-ACUITYAFLIBERCEPTTHERAPY

Age and Aging

20- COVID-19 vaccine hesitancy in a representative working-age population in France: a survey experiment based on vaccine characteristics

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Abstract

Background Opinion polls on vaccination intentions suggest that COVID-19 vaccine hesitancy is increasing worldwide; however, the usefulness of opinion polls to prepare mass vaccination campaigns for specific new vaccines and to estimate acceptance in a country's population is limited. We therefore aimed to assess the effects of vaccine characteristics, information on herd immunity, and general practitioner (GP) recommendation on vaccine hesitancy in a representative working-age population in France.
Methods In this survey experiment, adults aged 18-64 years residing in France, with no history of SARS-CoV-2 infection, were randomly selected from an online survey research panel in July, 2020, stratified by gender, age, education, household size, and region and area of residence to be representative of the French population. Participants completed an online questionnaire on their background and vaccination behaviour-related variables (including past vaccine compliance, risk factors for severe COVID-19, and COVID-19 perceptions and experience), and were then randomly assigned according to a full factorial design to one of three groups to receive differing information on herd immunity (>50% of adults aged 18-64 years must be immunised [either by vaccination or infection]; >50% of adults must be immunised [either by vaccination or infection]; or no information on herd immunity) and to one of two groups

regarding GP recommendation of vaccination (GP recommends vaccination or expresses no opinion). Participants then completed a series of eight discrete choice tasks designed to assess vaccine acceptance or refusal based on hypothetical vaccine characteristics (efficacy [50%, 80%, 90%, or 100%], risk of serious side-effects [1 in 10 000 or 1 in 100 000], location of manufacture [EU, USA, or China], and place of administration [GP practice, local pharmacy, or mass vaccination centre]). Responses were analysed with a two-part model to disentangle outright vaccine refusal (irrespective of vaccine characteristics, defined as opting for no vaccination in all eight tasks) from vaccine hesitancy (acceptance depending on vaccine characteristics).

Findings Survey responses were collected from 1942 working-age adults, of whom 560 (28.8%) opted for no vaccination in all eight tasks (outright vaccine refusal) and 1382 (71.2%) did not. In our model, outright vaccine refusal and vaccine hesitancy were both significantly associated with female gender, age (with an inverted U-shaped relationship), lower educational level, poor compliance with recommended vaccinations in the past, and no report of specified chronic conditions (ie, no hypertension [for vaccine hesitancy] or no chronic conditions other than hypertension [for outright vaccine refusal]). Outright vaccine refusal was also associated with a lower perceived severity of COVID-19, whereas vaccine hesitancy was lower when herd immunity benefits were communicated and in working versus non-working individuals, and those with experience of COVID-19 (had symptoms or knew someone with COVID-19). For a mass vaccination campaign involving mass vaccination centres and communication of herd immunity benefits, our model predicted outright vaccine refusal in 29.4% (95% CI 28.6-30.2) of the French working-age population. Predicted hesitancy was highest for vaccines manufactured in China with 50% efficacy and a 1 in 10 000 risk of serious side-effects (vaccine acceptance 27.4% [26.8-28.0]), and lowest for a vaccine manufactured in the EU with 90% efficacy and a 1 in 100 000 risk of serious side-effects (vaccine acceptance 61.3% [60.5-62.1]).

Interpretation COVID-19 vaccine acceptance depends on the characteristics of new vaccines and the national vaccination strategy, among various other factors, in the working-age population in France.

Keywords

Keywords Plus

DISCRETE-CHOICE EXPERIMENTS

Age and Aging

21- Antigen-Specific Adaptive Immunity to SARS-CoV-2 in Acute COVID-19 and Associations with Age and Disease Severity

By:
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Abstract

Limited knowledge is available on the relationship between antigen-specific immune responses and COVID-19 disease severity. We completed a combined examination of all three branches of adaptive immunity at the level of SARS-CoV-2-specific CD4(+) and CD8(+) T cell and neutralizing antibody responses in acute and convalescent subjects. SARS-CoV-2-specific CD4(+) and CD8(+) T cells were each associated with milder disease. Coordinated SARS-CoV-2-specific adaptive immune responses were associated with milder disease, suggesting roles for both CD4(+) and CD8(+) T cells in protective immunity in COVID-19. Notably, coordination of SARS-CoV-2 antigen-specific responses was disrupted in individuals R 65 years old. Scarcity of naive T cells was also associated with aging and poor disease outcomes. A parsimonious explanation is that co-ordinated CD4(+) T cell, CD8(+) T cell, and antibody responses are protective, but uncoordinated responses frequently fail to control disease, with a connection between aging and impaired adaptive immune responses to SARS-CoV-2.

Keywords
Keywords Plus
CD4(+) T-CELLSRESPONSESINFECTIONEFFECTORSARS

Age and Aging

22- Assessing the age specificity of infection fatality rates for COVID-19: systematic review, meta-analysis, and public policy implications

By:
Levin, AT (Levin, Andrew T.) [1] , [2] , [3] ; Hanage, WP (Hanage, William P.) [4] ; Owusu-Boaitey, N (Owusu-Boaitey, Nana) [7] ; Cochran, KB (Cochran, Kensington B.) [1] ; Walsh, SP (Walsh, Seamus P.) [1] ; Meyerowitz-Katz, G (Meyerowitz-Katz, Gideon) [5] , [6]
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Abstract

Determine age-specific infection fatality rates for COVID-19 to inform public health policies and communications that help protect vulnerable age groups. Studies of COVID-19 prevalence were collected by conducting an online search of published articles, preprints, and government reports that were publicly disseminated prior to 18 September 2020. The systematic review encompassed 113 studies, of which 27 studies (covering 34 geographical locations) satisfied the inclusion criteria and were included in the meta-analysis. Age-specific IFRs were computed using the prevalence data in conjunction with reported fatalities 4 weeks after the midpoint date of the study, reflecting typical lags in fatalities and reporting. Meta-regression procedures in Stata were used to analyze the infection fatality rate (IFR) by age. Our analysis finds a exponential relationship between age and IFR for COVID-19. The estimated age-specific IFR is very low for children and younger adults (e.g., 0.002% at age 10 and 0.01% at age 25) but increases progressively to 0.4% at age 55, 1.4% at age 65, 4.6% at age 75, and 15% at age 85. Moreover, our results indicate that about 90% of the variation in population IFR across geographical locations reflects differences in the age composition of the population and the extent to which relatively vulnerable age groups were exposed to the virus. These results indicate that COVID-19 is hazardous not only for the elderly but also for middle-aged adults, for whom the infection fatality rate is two orders of magnitude

greater than the annualized risk of a fatal automobile accident and far more dangerous than seasonal influenza. Moreover, the overall IFR for COVID-19 should not be viewed as a fixed parameter but as intrinsically linked to the age-specific pattern of infections. Consequently, public health measures to mitigate infections in older adults could substantially decrease total deaths.

Keywords
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Age and Aging

23- 2020 WHO guidelines on physical activity and sedentary behaviour for children and adolescents aged 5-17years: summary of the evidence

By:
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Abstract

BackgroundThe World Health Organization (WHO) released in 2020 updated global guidelines on physical activity and sedentary behaviour for children, adolescents, adults, older adults and sub-populations such as pregnant and postpartum women and those living with chronic conditions or disabilities.ObjectiveTo summarize the evidence on the associations between physical activity, sedentary behaviour, and health-related outcomes used to inform the 2020 WHO guidelines on physical activity and sedentary behaviour for children and adolescents aged 5-17years.MethodsThe update of the WHO guideline recommendations for children and adolescents utilized and systematically updated the evidence syntheses on physical activity and sedentary behaviour conducted for the 2016 Canadian 24-Hour Movement Guidelines for Children and Youth, the 2019 Australian 24-Hour Movement Guidelines for Children and Young People (5-17years), and the 2018 Physical Activity Guidelines for Americans, Second Edition. Systematic reviews published from 2017 up to July 2019 that addressed the key questions were identified, and the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework was used to rate the certainty of the evidence for the entire body of evidence.ResultsThe updated literature search yielded 21 relevant systematic reviews. The evidence base reviewed (i.e., existing and new systematic reviews) provided evidence that greater amounts and higher intensities of physical activity as well as different

types of physical activity (i.e., aerobic and muscle and bone strengthening activities) are associated with improved health outcomes (primarily
intermediate outcomes). There was sufficient evidence to support recommendations on limiting sedentary behaviours, which was not addressed in the 2010 WHO guidelines. However, there is still insufficient evidence available to fully describe the dose-response relationships between physical activity or sedentary behaviour and health outcomes, and whether the associations vary by type or domain of physical activity or sedentary behaviour.ConclusionsAddressing the identified research gaps will better inform guideline recommendations in children and adolescents, and future work should aim to prioritize these areas of research. In the meantime, investment and leadership is needed to scale up known effective policies and programs aimed at increasing activity in children and adolescents.

Keywords
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Age and Aging

24- Hesitant or Not? The Association of Age, Gender, and Education with Potential Acceptance of a COVID-19 Vaccine: A Country-level Analysis

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Abstract

In December 2020, the first COVID-19 vaccines were approved. Despite more than 85 million reported cases and 1.8 million known deaths, millions worldwide say they may not accept it. This study assesses the associations of age, gender, and level of education with vaccine acceptance, from a random sample of 13,426 participants selected from 19 high-COVID-19 burden countries in June 2020. Based on univariable and multivariable logistic regression, several noteworthy trends emerged: women in France, Germany, Russia, and Sweden were significantly more likely to accept a vaccine than men in these countries. Older (>= 50) people in Canada, Poland, France, Germany, Sweden, and the UK were significantly more favorably disposed to vaccination than younger respondents, but the reverse trend held in China. Highly educated individuals in Ecuador, France, Germany, India, and the US reported that they will accept a vaccine, but higher education levels were associated with lower vaccination acceptance in Canada, Spain, and the UK. Heterogeneity by demographic factors in the respondents' willingness to accept a vaccine if recommended by employers were substantial when comparing responses from Brazil,

Ecuador, France, India, Italy, Mexico, Poland, Russia, South Africa, South Korea, Sweden, and the US. This information should help public health authorities target vaccine promotion messages more effectively.

Age and Aging

25- Effectiveness of BNT162b2 (Pfizer-BioNTech) mRNA Vaccination Against Multisystem Inflammatory Syndrome in Children Among Persons Aged 12-18 Years - United States, July-December 2021

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Age and Aging

26- Prevalence, risk factors, and management of dementia and mild cognitive impairment in adults aged 60 years or older in China: a cross-sectional study

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Abstract

Background China has a large population of older people, but has not yet undertaken a comprehensive study on the prevalence, risk factors, and management of both dementia and mild cognitive impairment (MCI).

Methods For this national cross-sectional study, 46 011 adults aged 60 years or older were recruited between March 10, 2015, and Dec 26, 2018, using a multistage, stratified, cluster-sampling method, which considered geographical region, degree of urbanisation, economic development status, and sex and age distribution. 96 sites were randomly selected in 12 provinces and municipalities representative of all socioeconomic and geographical regions in China. Participants were interviewed to obtain data on sociodemographic characteristics, lifestyle, medical history, current medications, and family history, and then completed a neuropsychological testing battery administered by a psychological evaluator. The prevalence of dementia (Alzheimer's disease, vascular dementia, and other dementias) and MCI were calculated and the risk factors for different groups were examined using multivariable-adjusted analyses.

Findings Overall age-adjusted and sex-adjusted prevalence was estimated to be 60% (95% CI 58-63) for dementia, 39% (38-41) for Alzheimer's disease, 16% (15-17) for vascular dementia, and 05% (05-06) for other dementias. We estimated that 1507 million (95% CI 1453-1562) people aged 60 years or older in China have dementia: 983 million (939-1029) with Alzheimer's disease, 392 million (364-422) with vascular

dementia, and 132 million (116-150) with other dementias. Overall MCI prevalence was estimated to be 155% (152-159), representing 3877 million (3795-3962) people in China. Dementia and MCI shared similar risk factors including old age (dementia: odds ratios ranging from 269 [95% CI 243-298] to 660 [524-832]; MCI: from 189 [177-200] to 470 [377-587]); female sex (dementia: 143 [131-156]; MCI: 151 [143-159]); parental history of dementia (dementia: 720 [568-912]; MCI:191 [148-246]); rural residence (dementia:116 [106-127]; MCI:145 [138-154]); fewer years of education (dementia: from 117 [106-129] to 155 [138-173]; MCI: from 148 [139-158] to 348 [325-373]); being widowed, divorced, or living alone (dementia: from 259 [230-290] to 266 [229-310]; MCI: from 158 [144-173] to 174 [156-195]); smoking (dementia: 185 [167-204]; MCI: 127 [119-136]), hypertension (dementia: 186 [170-203]; MCI: 162 [154-171] for MCI), hyperlipidaemia (dementia: 187 [171-205]; MCI: 129 [121-137]), diabetes (dementia: 214 [196-234]; MCI: 144 [135-153]), heart disease (dementia: 198 [173-226]; MCI: 117 [106-130]), and cerebrovascular disease (dementia: 544 [495-597]; MCI: 149 [136-162]). Nine of these risk factors are modifiable.

Interpretation Dementia and MCI are highly prevalent in China and share similar risk factors. A prevention strategy should be developed to target the identified risk factors in the MCI population to thwart or slow down disease progression. It is also crucial to optimise the management of dementia and MCI as an important part of China's public health system.

Keywords

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Age and Aging

27- Risk for Newly Diagnosed Diabetes >30 Days After SARS-CoV-2 Infection Among Persons Aged <18 Years - United States, March 1, 2020-June 28, 2021

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Age and Aging

28- Update: Characteristics of Symptomatic Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2 Infection by Pregnancy Status - United States, January 22-October 3, 2020

By:
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Age and Aging

29- Why is COVID-19 less severe in children? A review of the proposed mechanisms underlying the age-related difference in severity of SARS-CoV-2 infections

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Abstract

In contrast to other respiratory viruses, children have less severe symptoms when infected with the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). In this review, we discuss proposed hypotheses for the age-related difference in severity of coronavirus disease 2019 (COVID-19).
Factors proposed to explain the difference in severity of COVID-19 in children and adults include those that put adults at higher risk and those that protect children. The former include: (1) age-related increase in endothelial damage and changes in clotting function; (2) higher density, increased affinity and different distribution of angiotensin converting enzyme 2 receptors and transmembrane serine protease 2; (3) pre-existing coronavirus antibodies (including antibody-dependent enhancement) and T cells; (4) immunosenescence and inflammaging, including the effects of chronic cytomegalovirus infection; (5) a higher prevalence of comorbidities associated with severe COVID-19 and (6) lower levels of vitamin D. Factors that might protect children include: (1) differences in innate and adaptive immunity; (2) more frequent recurrent and concurrent infections; (3) pre-existing immunity to coronaviruses; (4) differences in microbiota; (5) higher levels of melatonin; (6) protective off-target effects of live vaccines and (7) lower intensity of exposure to SARS-CoV-2.

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Age and Aging

30- Effectiveness of Maternal Vaccination with mRNA COVID-19 Vaccine During Pregnancy Against COVID-19-Associated Hospitalization in Infants Aged < 6 Months-17 States, July 2021-January 2022

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Age and Aging

31- Safety, tolerability, and immunogenicity of an inactivated SARS-CoV-2 vaccine in healthy adults aged 18-59 years: a randomised, double-blind, placebo-controlled, phase 1/2 clinical trial

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Abstract

Background With the unprecedented morbidity and mortality associated with the COVID-19 pandemic, a vaccine against COVID-19 is urgently needed. We investigated CoronaVac (Sinovac Life Sciences, Beijing, China), an inactivated vaccine candidate against COVID-19, containing inactivated severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), for its safety, tolerability and immunogenicity.
Methods In this randomised, double-blind, placebo-controlled, phase 1/2 clinical trial, healthy adults aged 18-59 years were recruited from the community in Suining County of Jiangsu province, China. Adults with SARS-CoV-2 exposure or infection history, with axillary temperature above 37.0 degrees C, or an allergic reaction to any vaccine component were excluded. The experimental vaccine for the phase 1 trial was manufactured using a cell factory process (CellSTACK Cell Culture Chamber 10, Corning, Wujiang, China), whereas those for the phase 2 trial were produced through a bioreactor process (ReadyToProcess WAVE 25, GE, Umea, Sweden). The phase 1 trial was done in a dose-escalating manner. At screening, participants were initially separated (1:1), with no specific randomisation, into two vaccination schedule cohorts, the days 0 and 14 vaccination cohort and the days 0 and 28 vaccination cohort, and within each cohort the first 36 participants were assigned to block 1 (low dose CoronaVac [3 mu g per 0.5 mL of aluminium

hydroxide diluent per dose) then another 36 were assigned to block 2 (high-dose Coronavc [6 mu g per 0.5 mL of aluminium hydroxide diluent per dse]). Within each block, participants were randomly assigned (2:1), using block randomisation with a block size of six, to either two doses of CoronaVac or two doses of placebo. In the phase 2 trial, at screening, participants were initially separated (1:1), with no specific randomisation, into the days 0 and 14 vaccination cohort and the days 0 and 28 vaccination cohort, and participants were randomly assigned (2:2:1), using block randomisation with a block size of five, to receive two doses of either low-dose CoronaVac, high-dose CoronaVac, or placebo. Participants, investigators, and laboratory staff were masked to treatment allocation. The primary safety endpoint was adverse reactions within 28 days after injection in all participants who were given at least one dose of study drug (safety population). The primary immunogenic outcome was seroconversion rates of neutralising antibodies to live SARS-CoV-2 at day 14 after the last dose in the days 0 and 14 cohort, and at day 28 after the last dose in the days 0 and 28 cohort in participants who completed their allocated two-dose vaccination schedule (per-protocol population). This trial is registered with ClinicalTrials.gov, NCT04352608, and is closed to accrual.

Findings Between April 16 and April 25, 2020, 144 participants were enrolled in the phase 1 trial, and between May 3 and May 5, 2020, 600 participants were enrolled in the phase 2 trial. 743 participants received at least one dose of investigational product (n=143 for phase 1 and n=600 for phase 2; safety population). In the phase 1 trial, the incidence of adverse reactions for the days 0 and 14 cohort was seven (29%) of 24 participants in the 3 ug group, nine (38%) of 24 in the 6 mu g group, and two (8%) of 24 in the placebo group, and for the days 0 and 28 cohort was three (13%) of 24 in the 3 mu g group, four (17%) of 24 in the 6 mu g group, and three (13%) of 23 in the placebo group. The seroconversion of neutralising antibodies on day 14 after the days 0 and 14 vaccination schedule was seen in 11 (46%) of 24 participants in the 3 mu g group, 12 (50%) of 24 in the 6 mu g group, and none (0%) of 24 in the placebo group; whereas at day 28 after the days 0 and 28 vaccination schedule, seroconversion was seen in 20 (83%) of 24 in the 3 mu g group, 19 (79%) of 24 in the 6 mu g group, and one (4%) of 24 in the placebo group. In the phase 2 trial, the incidence of adverse reactions for the days 0 and 14 cohort was 40 (33%) of 120 participants in the 3 mu g group, 42 (35%) of 120 in the 6 mu g group, and 13 (22%) of 60 in the placebo group, and for the days 0 and 28 cohort was 23 (19%) of 120 in the 3 mu g group, 23 (19%) of 120 in the 6 mu g group, and 11 (18%) of 60 for the placebo group. Seroconversion of neutralising antibodies was seen for 109 (92%) of 118 participants in the 3 mu g group, 117 (98%) of 119 in the 6 mu g group, and two (3%) of 60 in the placebo group at day 14 after the days 0 and 14 schedule; whereas at day 28 after the days 0 and 28 schedule, seroconversion was seen in 114 (97%) of 117 in the 3 mu g group, 118 (100%) of 118 in the 6 mu g group, and none (0%) of 59 in the placebo group.

Interpretation Taking safety, immunogenicity, and production capacity into account, the 3 mu g dose of CoronaVac is the suggested dose for efficacy assessment in future phase 3 trials.

Age and Aging

32- Risk Factors for Severe COVID-19 Outcomes Among Persons Aged >= 18 Years Who Completed a Primary COVID-19 Vaccination Series-465 Health Care Facilities, United States, December 2020-October 2021

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