Sex, respiratory pathogenesis and

JOURNAL ARTICLE

Sex, Immunity and Influenza

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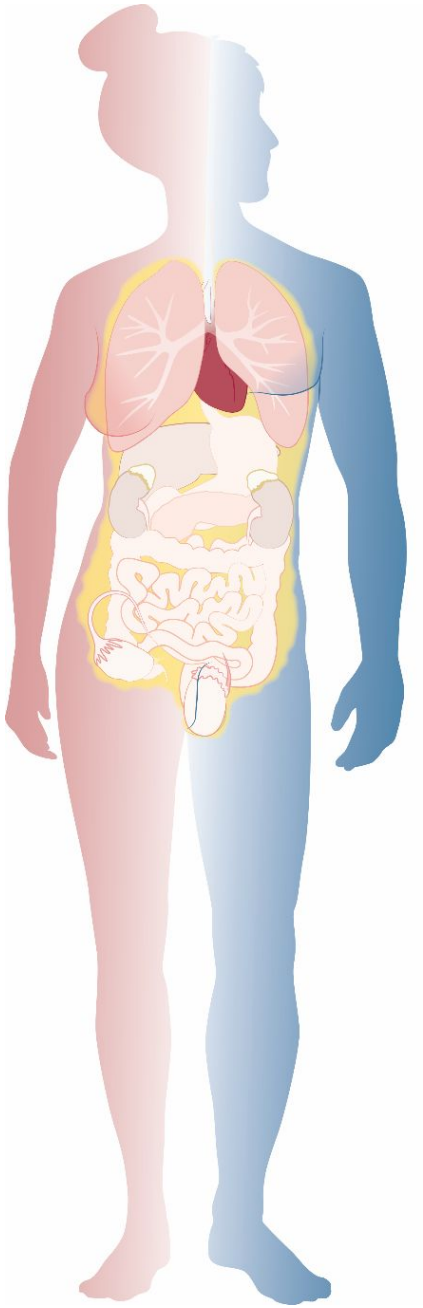
Abstract

Sex-specific endocrine and immune responses are widely recognized to account for differential disease outcomes between females and males. Surprisingly, sex-specific risk assessments for influenza, a viral pathogen that affects human populations worldwide through seasonal epidemics and irregular occurring pandemics, are sparse and—if available—ambiguous. To date, this precludes proposing an unequivocal sex-dependent susceptibility to influenza. However, one undisputable observation recurrently confirmed during influenza seasons of the last decades is the significantly increased risk for pregnant women. This increased risk is likely attributable to the contradictory demands for the maternal immune system to adapt to pregnancy and to simultaneously mount an immune response to clear the influenza virus infection. Here, we review published evidence on the potential association between sex on influenza risk and propose that future epidemiologic studies should carefully dissect surveillance data for sex-specific effects. Moreover, we propose potential mechanisms involved in enhanced risk for severe influenza during pregnancy that could be studied to identify causal pathways.



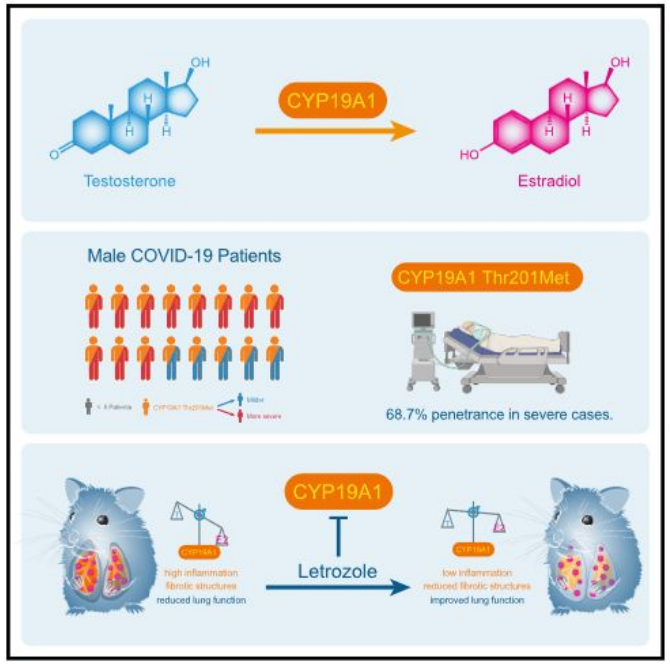
Males are at higher risk to develop severe COVID-19 during the acute phase.

Cell Reports
Medicine

Article

CYP19A1 mediates severe SARS-CoV-2 disease outcome in males

Graphical abstract



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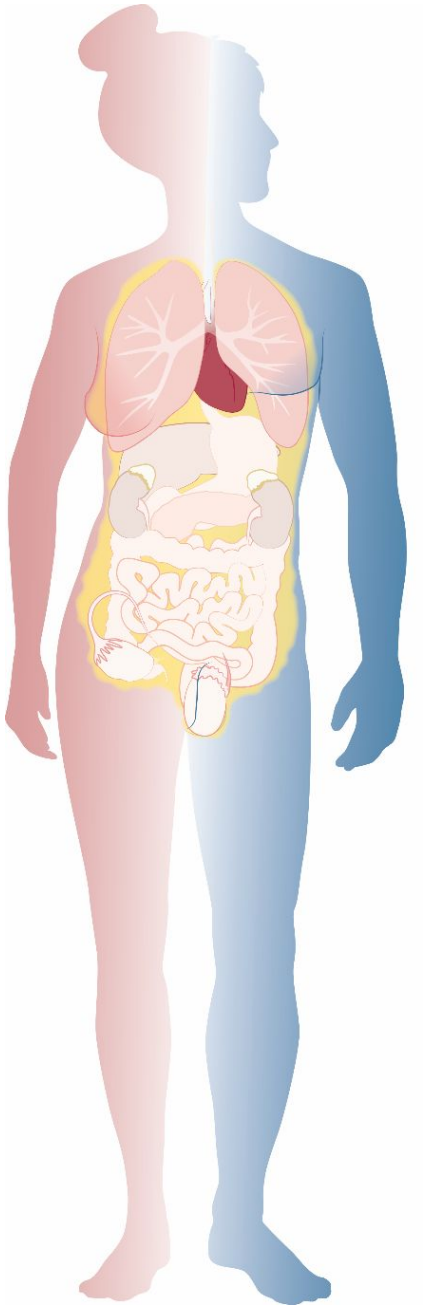
In brief

Stanelle-Bertram et al. identify a CYP19A1-activity-increasing gene variant in male patients with severe COVID-19. Increased pulmonary *CYP19A1* expression is associated with dysregulated sex hormone levels and impaired lung function in SARS-CoV-2-infected male hamsters. The clinically approved CYP19A1 inhibitor letrozole improves long-term lung health in SARS-CoV-2-infected male hamsters.



Females are more likely to develop long-COVID after SARS-CoV-2 infection.

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Original article

Female gender is associated with long COVID syndrome: a prospective cohort study

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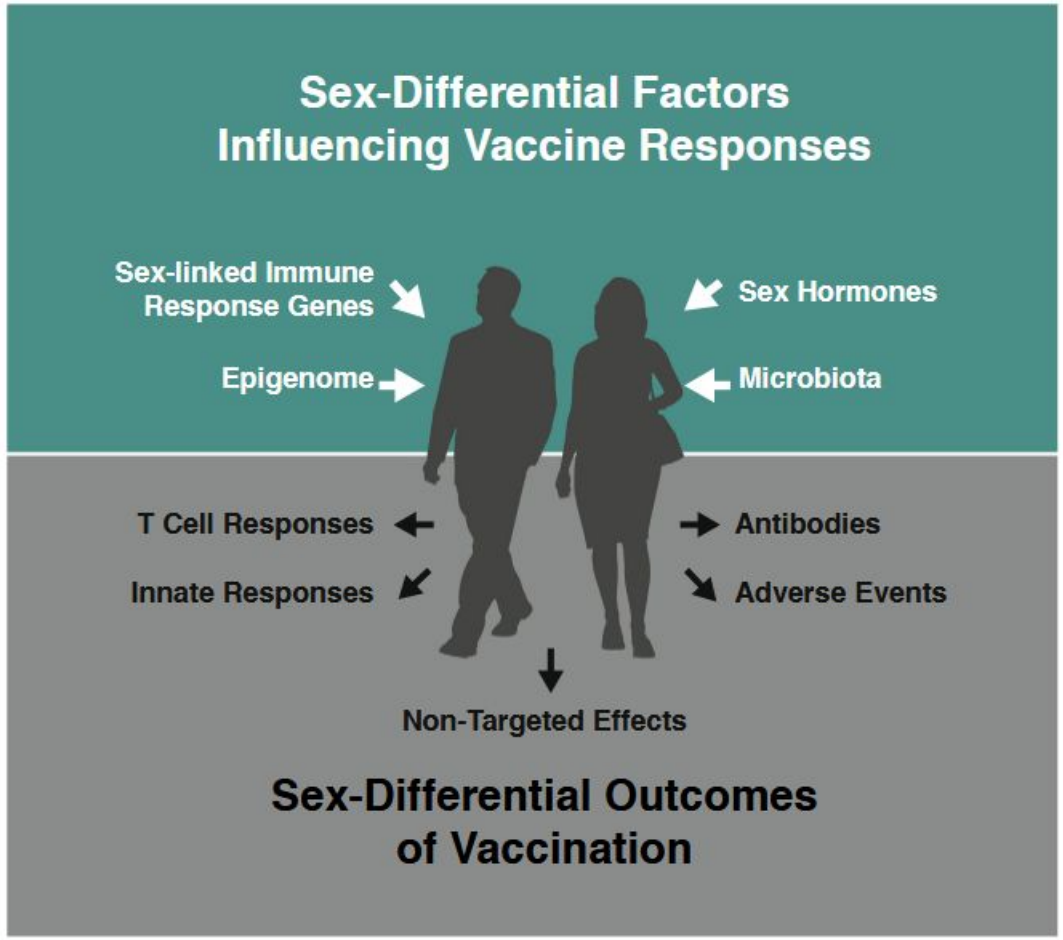
ABSTRACT

Objective: We explored the association between female gender and long COVID syndrome, defined as persistence of physical and/or psychological symptoms for more than 4 weeks after recovery from acute COVID-19 disease. The secondary aim was to identify predictors of long COVID syndrome by multivariable logistic regression analysis.

Methods: This was a single-centre prospective cohort study conducted at San Paolo Hospital in Milan, Italy. We enrolled adult patients who were evaluated at the post-COVID outpatient service of our Infectious Diseases Unit between 15 April 2020 and 15 December 2020. Participants were individuals who had clinically recovered from COVID-19 and in whom virological clearance had occurred. Previous infection by SARS-CoV-2 was microbiologically documented by positivity using a reverse-transcriptase polymerase chain reaction (RT-PCR) assay of nasopharyngeal swab. All enrolled patients underwent blood tests and a comprehensive medical examination at follow-up. Individuals were interviewed about resolved and persisting symptoms and were asked to fill in two questionnaires to allow assessment of the Hospital Anxiety and Depression symptoms (HADS) score and of the Impact of Event Scale–Revised (IES-R) score.

Sex and vaccination outcomes



Current Opinion in Pharmacology

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Current Opinion in Pharmacology

Effect of sex on vaccination outcomes: important but frequently overlooked

Alice Harper[1] and Katie L Flanagan[1,2,3]

It is well established that vaccination does not affect males and females equally. For example, females generally mount greater antibody responses to vaccination than males, but also suffer more adverse events following vaccination, probably as a result of more robust immunity. Despite this, most researchers in the field of vaccinology do not take biological sex into account when conducting their studies. This omission is likely to lead to a loss of important information in terms of both reactogenicity and immunogenicity following vaccination as well as those suffering adverse events. It also suggests that the vaccine dose in males and females may need to be different in order to achieve the same outcome of protective immunity while minimising reactogenicity.

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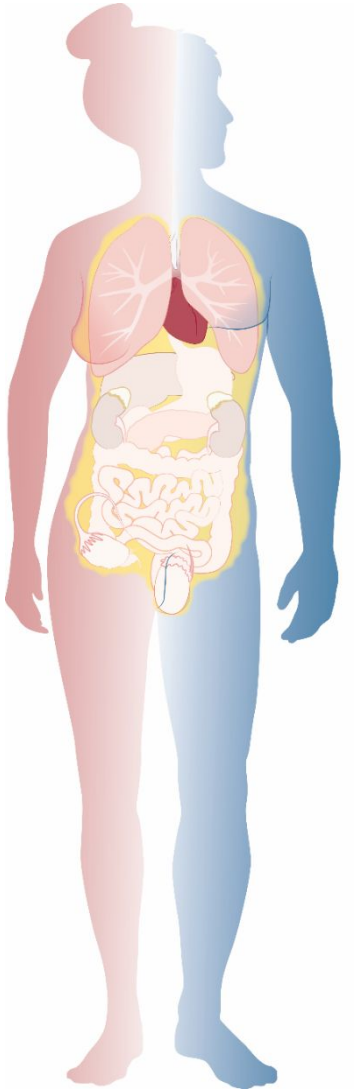
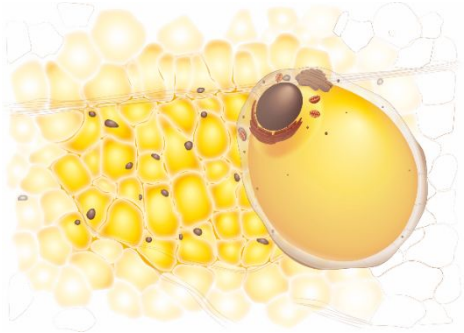
Antibody responses to vaccination

Antibody responses serve as the accepted correlate of protection for most vaccines. On the whole, females mount greater antibody responses to vaccination than their male counterparts from birth to old age [1••] (Table 1). This includes greater antibody responses in females following vaccination with the inactivated diphtheria, hepatitis B, influenza, rabies, pertussis and pneumococcal vaccines and the live measles vaccine [1••]. Murine studies also show that antibody isotype profile may vary by sex [4]. However, males may have greater antibody responses than females to certain vaccines or both sexes have equivalent responses. For example, elderly males >65 years mount greater antibody responses to influenza, tetanus-low dose diphtheria (Td) and Td-acellular pertussis (Tdap) vaccines than corresponding elderly females [1••]. A recent meta-analysis for sex differences in IgG responses across six Dutch studies found slightly higher vaccine-stimulated pneumococcal titres in females following vaccination with the pneumococcal conjugate vaccines (PCV7, PCV10, PCV13) but otherwise no sex differences in responses to the Pentavalent vaccine (diphtheria-tetanus-acellular

Future challenges:
eradication of potential silent virus reservoirs





Cell Metabolism

CellPress

Letter

Replication of SARS-CoV-2 in adipose tissue determines organ and systemic lipid metabolism in hamsters and humans

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