On the Epidemiology of Influenza

How Does Vitamin D Influence Influenza?
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FROM ABSTRACT:
The epidemiology of influenza swarms with incongruities, incongruities exhaustively detailed by the late British epidemiologist, Edgar Hope-Simpson. He was the first to propose a parsimonious theory explaining why influenza is, "seemingly unmindful of traditional infectious disease behavioral patterns."

Recent discoveries indicate vitamin D upregulates the endogenous antibiotics of innate immunity and suggest that the incongruities explored by Hope-Simpson may be secondary to the epidemiology of vitamin D deficiency.

THESE AUTHORS ALSO NOTE:
"The most universally accepted assumption about influenza is that it is a highly infectious virus spread by the sick. Edgar Hope-Simpson not only questioned that assumption, he went much further. Realizing that solar radiation has profound effects on influenza."

Recently epidemiological studies question vaccine effectiveness because "influenza mortality and hospitalization rates for older Americans significantly increased in the 80's and 90's, during the same time that influenza vaccination rates for elderly Americans dramatically increased."

A 2006 study stated "We found no evidence of reduction in influenza-related mortality in the last 15 years, despite the concomitant increase of influenza vaccination coverage from ~10% to ~60%."

"Why don't epidemiological studies show increasing vaccination rates are translating into decreasing illness?"

"Why have epidemic patterns in Great Britain not altered in four centuries, centuries that have seen great increases in the speed of human transport."

Vitamin D, innate immunity, and influenza

"Hope-Simpson's model theorized that an unidentified 'seasonal stimulus,' inextricably bound to solar radiation, substantially controlled the seasonality of influenza."

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This 'seasonal stimulus' may be seasonal impairments of the antimicrobial peptide (AMPs) systems crucial to innate immunity caused by dramatic seasonal fluctuations in 25-hydroxy-vitamin D.

"The evidence that vitamin D has profound effects on innate immunity is rapidly growing."

In a 2007 study, 104 women given vitamin D were three times less likely to report cold and flu symptoms than placebo controls. "A low dose (800 IU/day) not only reduced reported incidence, it abolished the seasonality of reported colds and flu. A higher dose (2000 IU/day), given during the last year of their trial, virtually eradicated all reports of colds or flu."

"Vitamin D is the 'antibiotic vitamin' due primarily to its robust effects on innate immunity."

Innate immunity is that branch of host defense that is "hard-wired" to respond rapidly to microorganisms.

"Relative – but easily correctable – deficiencies in innate immunity probably exist in many dark-skinned and aged individuals, especially during the winter," because of reduced ability to produce vitamin D.

During the 1918 flu pandemic, there were five attempts to transmit the flu to a well person from a sick person, and these attempts exceeded a combined total of 150 well patients. Methods of transmission included cough, spit, and breathe. None of these attempts succeeded.

QUESTIONS and ANSWERS

1) What explains the frequent coincidental timing of flu epidemics in countries of similar latitudes?

"Simultaneous impairments of innate immunity at similar latitudes – due to seasonal sunlight deprivation – explain the almost simultaneous eruption of influenza at sites of different longitude but similar latitude. If the virus had already imbedded itself in a population and a subgroup of the infected became good transmitters when their innate immunity declines to a critical threshold, such transmitters would coincidentally infect populations at similar latitudes made susceptible by those same impairments in innate immunity."

2) Why did epidemics in previous ages spread so rapidly, despite the lack of modern transport?

"If influenza were embedded in the population, only to erupt when impairments in innate immunity create a susceptible subpopulation, the disease would only give the appearance of spreading."

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3) Why does experimental inoculation of seronegative humans fail to cause consistent illness?
"If influenza is highly infectious, one would expect most, if not all, human volunteers iatrogenically inoculated with a novel virus to fall ill." Variations in the innate immunity of the volunteers could explain this illness response. "We propose individual variations in vitamin D3 levels explain some degree of the variations in illness response."

4) Over the last 20 years, why has influenza mortality in the aged not declined with increasing vaccination rates?
"Given that influenza vaccines effectively improve adaptive immunity, the most likely explanation is that the innate immunity of the aged declined over the last 20 years due to medical and governmental warnings to avoid the sun. While the young usually ignore such advice, the elderly often follow it. We suggest that improvements in adaptive immunity from increased vaccination of the aged are inadequate to compensate for declines in innate immunity the aged suffered over that same time."

CONCLUSIONS:
"Compelling epidemiological evidence indicates vitamin D deficiency is the 'seasonal stimulus' [responsible for flu outbreaks]."
Lower respiratory tract infections are more frequent in those with low vitamin D3 levels. Vitamin D3 regulates 1,000 human genes.

A 2007 study found 2,000 IU of vitamin D per day "abolished the seasonality of influenza."

KEY POINTS
1) Vitamin D upregulates the endogenous antibiotics of innate immunity and suggest that the incongruities in flu behaviour may be secondary to the epidemiology of vitamin D deficiency.

2) Recently epidemiological studies question vaccine effectiveness because "influenza mortality and hospitalization rates for older Americans significantly increased in the 80's and 90's, during the same time that influenza vaccination rates for elderly Americans dramatically increased."

3) A 2006 study stated "We found no evidence of reduction in influenza-related mortality in the last 15 years, despite the concomitant increase of influenza vaccination coverage from ~10% to ~60%."

4) The seasonality of influenza indicates that it is controlled by a "seasonal stimulus." This "seasonal stimulus" may be seasonal impairments of the antimicrobial peptide systems crucial to innate immunity caused by dramatic seasonal fluctuations in vitamin D3.

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5) Innate immunity is that branch of host defense that is "hard-wired" to respond rapidly to microorganisms.

6) "The evidence that vitamin D has profound effects on innate immunity is rapidly growing." "Vitamin D is the 'antibiotic vitamin' due primarily to its robust effects on innate immunity."

7) In a 2007 study, 104 women given vitamin D were three times less likely to report cold and flu symptoms than placebo controls. "A low dose (800 IU/day) not only reduced reported incidence, it abolished the seasonality of reported colds and flu. A higher dose (2000 IU/day), given during the last year of their trial, virtually eradicated all reports of colds or flu."

8) "Relative – but easily correctable – deficiencies in innate immunity probably exist in many dark-skinned and aged individuals, especially during the winter," because of reduced ability to produce vitamin D.

9) During the 1918 flu pandemic, there were five attempts to transmit the flu to a well person from a sick person, and these attempts exceeded a combined total of 150 well patients. Methods of transmission included cough, spit, and breathe. None of these attempts succeeded. **[Very Interesting]**

10) In previous ages, flu epidemics spread rapidly despite the lack of modern transport because influenza was already embedded in the population and erupted when impairments in innate immunity occurred as a consequence of seasonal reduced vitamin D.

11) These authors propose individual variations in vitamin D3 levels explain the variations in the innate immunity of the volunteers who purposefully exposed themselves to the flu but did not become ill.

12) Influenza mortality has not declined with increasing vaccination rates because influenza vaccines improve adaptive immunity, and the key is innate immunity. **[The innate immune response rules the adaptive immune response: if the innate immune response ignores an invader, one will not make antibodies {adaptaive immune response} to that invader. How the Immune System Works, by Loren Sompayrac, Blackwell Science, 2008]**

"The innate immunity of the aged declined over the last 20 years due to medical and governmental warnings to avoid the sun. While the young usually ignore such advice, the elderly often follow it. We suggest that improvements in adaptive immunity from increased vaccination of the aged are inadequate to compensate for declines in innate immunity the aged suffered over that same time."

13) "Compelling epidemiological evidence indicates vitamin D deficiency is the 'seasonal stimulus' [responsible for flu outbreaks]."

14) Lower respiratory tract infections are more frequent in those with low vitamin D3 levels.

15) Vitamin D3 regulates 1,000 human genes.

16) A 2007 study found 2,000 IU of vitamin D per day "abolished the seasonality of influenza."

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