

#HEALTH

Vitamin A: More Than the Eye

Immunology and organ toxicity meet vitamin A



Shin Jie Yong

Among the micronutrients, vitamin A plays a central role in normal immune function," writes Richard D. Semba, M.D., M.A., M.P.H. from Johns Hopkins University in chapter 12 of "Military Strategies for Sustainment of Nutrition and Immune Function in the Field."

According to Semba, "no nutritional deficiency is more consistently synergistic with the infectious disease than that of vitamin A." Vitamin A deficiency is conventionally linked to night-blindness or problems with eye health. But an underappreciated role of vitamin A lies in the immune system.

First demonstrated in 1928 by Green and Mellandy that rats on a vitamin A-deficient diet were more susceptible to microbial infections. Analysis of their dead bodies revealed the presence of pathogenic bacteria streptococci, staphylococci, and bacilli - in many of the deteriorated organs and tissues.

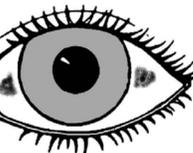
There are two forms of vitamin A. Preformed vitamin A includes retinol, retinal, and retinoic acid that is stored in the liver and sourced from animal products such as eggs, liver, and dairy. Whereas provitamin A is called carotenoids that are stored in the adipose tissues. Carotenoids are derived from plant sources like spinach, squash, and carrots.

Remarkably, vitamin A can mount both arms - innate and adaptive - of the immune system, which is usually difficult with vaccines. Scientists, therefore, quickly started investigating vitamin A. In the hope that it could revolutionize how we fight microbial infections.

Vitamin A deficiency
A 3-year longitudinal study found that low baseline levels of vitamin A (both retinol and carotenoids) in the blood were associated with a 10-fold greater risk of tuberculosis among household contacts of tuberculosis patients. This means that people near tuberculosis patients are 10 times more likely to contract tuberculosis themselves if they lack adequate vitamin A.

This relationship is also dose-dependent - the lower the vitamin A levels, the greater the risk. Even in the broader context, tuberculosis patients often have lower plasma levels of vitamin A than the healthy population.

Most of the studies on the immunological roles of vitamin A involves children as their developing immune system makes them particularly vulnerable to the consequences of vitamin A deficiency. Children with this deficiency became highly susceptible to acute infections of the respiratory and intestinal tracts. In rural areas, 16% of



Vitamin A surplus

Large amounts of carotenoids do not cause any complications, except transforming the skin colour into yellow-orange. But it is the opposite for excessive preformed vitamin A that is fat-soluble, thus, being able to accumulate in the body.

While vitamin A deficiency is rare in the US, its surplus and toxicity are relatively common with over 60,000 cases every year. The majority, if not all, of such cases, are due to supplements or therapeutic retinoids, and not from real foods.

The Eskimos and arctic travellers know that consuming the liver of polar bear is poisonous that can cause drowsiness, sluggishness, irritability, uncontrollable sleepiness, severe headache, vomiting, and sometimes the "skin peeled from head to foot."

These symptoms of hypervitaminosis A can also manifest over a long period, as a result of the gradual accumulation of preformed vitamin A (>10,000 IU/day) to unhealthy levels. Such toxicity destroys many organs like the liver, bone, heart, and central nervous system. Unborn babies can also be affected by hypervitaminosis A of the pregnant mother, causing congenital disorders such as Down syndrome, cystic fibrosis, and cerebral palsy.



A Soldier's Soldier



Oil portrait of Gen KM Cariappa by Lady Ney, wife of the British High Commissioner to India.

One of Indian Army's most decorated generals, Field Marshal KM Cariappa blazed a trail in the Indian Armed Forces with his unrelenting patriotism. He is best remembered as the legend who made the Indian Army truly Indian. Perhaps this is why General Bipin Rawat, the current Chief of Defence Services, feels that the time has come to honour the late Field Marshal with the Bharat Ratna award. Interestingly, till date, no military person has ever been awarded the Bharat Ratna, India's highest civilian award that is awarded in any "field of human endeavour". Despite being one of Indian Army's most decorated generals, few Indians know about the legendary Field Marshal whose unrelenting patriotism and courage blazed a trail in the Indian Armed Forces. Here's the fascinating story of KM Cariappa, a man who would invariably occupy the top spot if one were to count the most distinguished soldiers of India.



Lt Gen Baljit Singh, AVSM, VSM
Military Historian, Sportsman & Environmentalist

#SALUTE

A slim, ramrod straight man in immaculate Army uniform along with a boy not yet in his teens and a sprightly little girl were perhaps the first visitors at the Gandhi Samadhi on 15 January 1949. And paying floral homage to the Father of the Nation was the paramount act in the personal conduct of the first Indian C-in-C of the Army, General KM Cariappa ('Kipper' to his friends and peers). There were no ceremonial trappings or Guard of Honour even when he simply walked into the appointed high ground.

The Government of India on their part had not been lacking in grace as evidenced from Sardar Patel's letter: "Your record of achievements inspire our confidence in your ability to lead your men at such a critical period of the country's history and I can assure you that we on our part will extend to you all goodwill and cooperation in the discharge of your responsibilities..."

Make-in-India

Now General Cariappa would in true sense of the current 'Make-in-India' idiom, be among the country's best products! Born and schooled at Mercara village in Coorg (Karnataka) and after a brief exposure at the Presidency College Madras, he qualified for the first batch to enter the 'Temporary School for Indian Cadets, at the Daly College, Indore on 01 June 1918'.

Commissioned 2nd Lieutenant in the Indian Army on 01 December 1919, he aggregated two decades of baptism under battlefield-fire on the restive North West Frontier, concomitantly became the first Indian to graduate from the Defence Service Staff College, Quetta and later also the Imperial Defence College, London.

As may be imagined, he had distinguished in varied command and staff assignments during WW II in Iraq, Iran and throughout the Burma campaign, closing that phase of soldiering with "Mentioned in Despatch" thrice.

When in October 1947 Pakistan

ignited the J&K War, Maj Gen Cariappa was neck deep in the Army Reorganisation Committee but in January 1948, he was promoted to command the newly created Western Command and conduct the J&K War at a time when the fall of Ladakh seemed imminent.

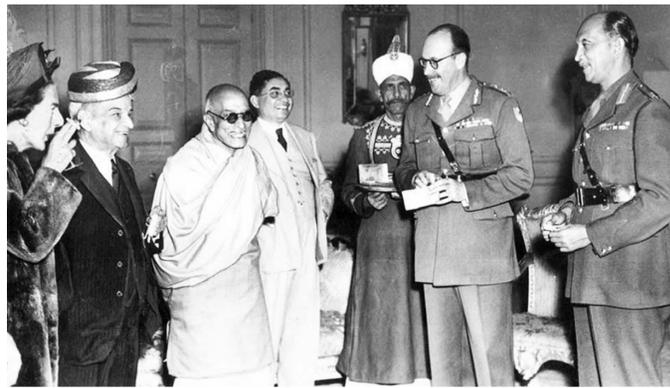
The very next day, he was promoted to senior commanders and staff with forceful resolve that "We will not allow General Tarik to capture Leh. We have got to stop this and we will stop it...we have decided to take tanks up the Zoji Pass...a kind of operation which has never been done before...we will have a good shot at it," a rare voice recorded preserved in archives. The rest is history.

The full measure of General Cariappa as a man and the Army Chief perhaps best emerges from an hour-long conversation with PU Oza, a journalist who published a full-bodied text "Meet India's New Commander-in-Chief" on 15 January 1949. When asked what he thought of Indian soldier, General Cariappa's instant response was "Magnificent! Second to none! In Kashmir Southerners and Northerners alike were running up and down the snow-covered heights of 16,000-17,000 ft, unfazed...At home the soldier is simple, almost like a child. In the battlefield he is a veritable tiger; inspiring awe and fear. As a victor he is restrained, unassuming, kind to his foe, devoid of any feeling of undue arrogance towards his captive..."

To Oza's enquiry of the desirability



KM Cariappa with his son.



Roy Bucher (the outgoing Commander-in-Chief) and Lady Bucher at Government House, New Delhi, with C Rajagopalachari and the new Commander-in-Chief, KM Cariappa.



Three Hearts

Octopuses are boneless creatures. They are invertebrates with extremely flexible bodies that can squeeze through incredibly small spaces. An octopus has three hearts, nine brains, and blue blood. Two hearts pump blood to the gills, while a third circulates it to the rest of the body. The nervous system includes a central brain and a large ganglion at the base of each arm which controls movement. Octopus, along with squid, cuttlefish, and nautilus, are cephalopods. Most of the hundreds of species of cephalopods have three hearts.



KM Cariappa meeting PM Nehru.



KM Cariappa with the Indian Finance Minister Shri CD Desmukh in 1953.

ity of soldiers having political leanings "the C-in-C would like the public to understand that the Army must remain aloof from and be above politics...he would like to give the forces every opportunity to keep themselves informed on political affairs. But they must not go beyond any participation in politics becomes a dangerous canker..."

Highest Standards

Oza concludes with the nugget that "Cariappa would like the Indian Army to be the best in the world" based on "highest standards of loyalty, supreme sense of duty and selflessness in the service of the Country, subordinating all interests, personal and sectarian..."

Cariappa finally retired in 1953 after a long and illustrious career. In 1986, he was awarded the five-star rank of field marshal, the highest honour in the Indian Army (Sam Manekshaw is the only other officer to have held it). He was also honoured with the 'Order of the Chief Commander of the Legion of Merit' by US President Harry Truman.

However, even after his retire-

Leading From the Front



A tireless worker, whose hobbies included reading and playing sports, Cariappa always led from the front, and by personal example. A strong believer in the power of personal communication, he would make it a point to spend time with his troops, to ask them about their food, their comfort and whether they had received letters from home.

Soldiers who served under him also remember him motivating them frequently, saying, "I will never ask you to do anything that I am myself incapable of doing."

Here are two anecdotes about Cariappa that elucidate why he is so deeply respected in the Indian Armed Forces.

In 1947, the war was raging in Kashmir and it had resulted in a severe food scarcity in many villages of the region. Once, while chasing the raiders beyond Uri, Cariappa was stopped by a group of hungry people at Baramulla who told them about their suffering. After assuring them that he would do his best to help them, he resumed the chase.

The next day, he fulfilled his assurance by returning to the town with flour, rice, and salt that he distributed to the needy families. He also ensured that this was repeated in other villages that were suffering from food scarcity, inspiring another Indian military legend - KS Thimayya leading the 19th Infantry Division - to do the same. Later, the grateful residents of Baramulla named a park after Cariappa (it still exists today).

Field Marshal Ayub Khan (and future President of Pakistan) had served under Cariappa in the British Indian Army. During the 1965 Indo-Pak war, Cariappa's son - Lt. Lt. KC "Nanda" Cariappa (who would later become an Air Marshal) was taken prisoner-of-war after his Hunter aircraft was shot down in Pakistani territory.

Ayub Khan contacted Cariappa and offered to release his son immediately, to which the retired general tersely replied: "He is my son no longer... He is the child of this country, a soldier fighting for his motherland like a true patriot. My many thanks for your kind gesture, but I request you to release all or release none. Give him no special treatment."

Truly, KM Cariappa was a Soldier's Soldier!

#COVID-WATCH

Are Face Shields Better Than Masks?

Philip Russo/Brett Mitchell
Monash University, Australia
The University of Newcastle, UK

For several weeks, citizens in many countries have been required to wear a face covering when they leave home. And while we now have a clearer path out of lockdown, it is likely masks will be around for a while.

Meanwhile, people in other places with outbreaks have been encouraged to wear masks, and some people are simply choosing to wear one as a precaution.

But some people, instead of opting for a traditional mask, are instead wearing a face shield.

This might offer some degree of protection - but it is probably not as good as a mask in preventing the spread of Covid-19.

What is a face shield?

A face shield is a film made from plastic or other transparent material designed to be worn like a visor. It is attached using a band that goes around the top of your head.

Think of a visor a welder wears to protect themselves from sparks and injury. Healthcare workers use face shields to block bodily fluids from coming into contact with their face and potentially causing infection.

It is likely many people are choosing face shields during Covid-19 because they are experiencing discomfort wearing a mask - whether glasses fogging up, irritation around the ears or just that extra layer.

The term 'face covering', as per some government guidelines, is notably vague. It can include a face mask, a face shield, or a scarf or bandana.

Australia's department of health does, however, recommend a mask over a face shield.

How effective are face shields?
A letter, published recently in the journal Physics of Fluids, reported on a laboratory experiment where scientists put face shields to the test.

They simulated coughing by connecting the head of a mannequin to a fog machine and then using a pump to expel the vapour through the mannequin's mouth.

They found that while face shields stopped the droplets

A face shield offers some degree of protection - but it is probably not as good as a mask in preventing the spread of Covid-19



being propelled forward, aerosolised droplets - those much smaller in size - lingered at the bottom of the shield and floated around at the sides. They eventually spread approximately 90 centimetres from the mannequins.

This is an interesting laboratory experiment, but not conclusive evidence face shields offer less protection than masks in the community.

A lack of research on the effectiveness of face shields means it is not possible to make any strong recommendations for or against their use.

Where does this leave us?
There is a lot we still do not know about this virus and how it spreads.

At present, we believe the virus is spread generally through close contact with an infectious person, contact with the droplets emitted when they sneeze or cough, or contact with surfaces these droplets have contaminated.

To establish an infection the virus enters your body through portals of entry: the mouth, nose, and eyes.

Wearing a mask is intended to protect others if you have the infection, by blocking the droplets coming out of your mouth and nose. We call this source control. To a degree - though we have less evidence on this front - it is also likely to protect you, the wearer, by providing a physical barrier to your portals of entry.

Correct use is important too. Whatever face covering you choose, you must use it properly, and it must fit correctly.

Having masks slung under the chin, hanging off one ear, or your nose poking out over the top of the mask will make them markedly less effective. And of course, frequently touching and re-adjusting the mask means we are possibly contaminating our hands too.

If you do not intend to wear a mask properly or you are unable to, then a face shield is a better option. You can also wear a mask and a face shield together, should you wish to.

Like masks, there are a variety of face shields available, varying in quality and size. The department of health advises if you wear a face shield it should cover "the wearer's forehead to below the chin area and wrapping around the sides of the wearer's face".

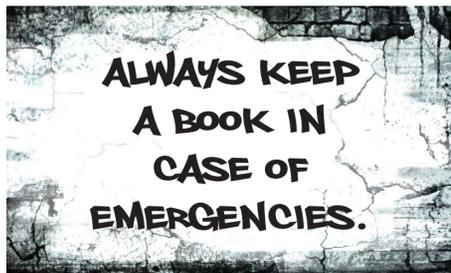
You should not share a face shield. If they are labelled disposable, do not reuse them. And if they are reusable you need to clean them regularly following the manufacturer's instructions.

The upshot
Masks worn correctly are the best option. When wearing a mask is not possible, then a face shield is better than nothing. Neither will work well if not used properly and importantly, they do not replace physical distancing and hand hygiene.

(This article first appeared in The Conversation)



THE WALL

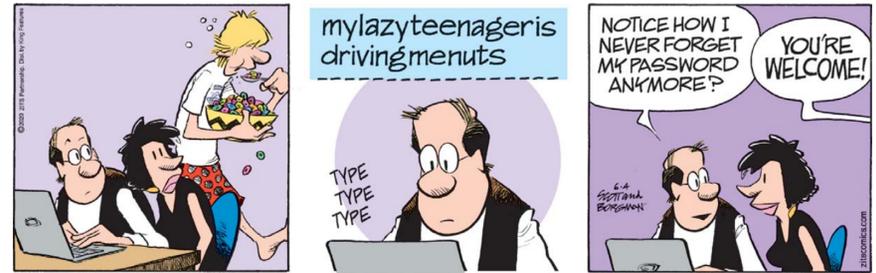


BABY BLUES



By Rick Kirkman & Jerry Scott

ZITS



By Jerry Scott & Jim Borgman