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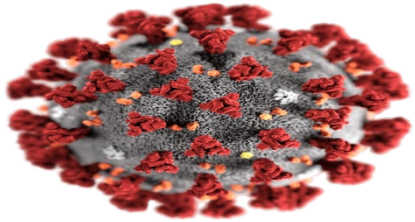
La dieta mediterranea è la dieta anti Covid – 19 ?

Carmela Bagnato

U.O. Nutrizione Clinica e dietetica - Ospedale Matera

MALATTIA DA CORONAVIRUS

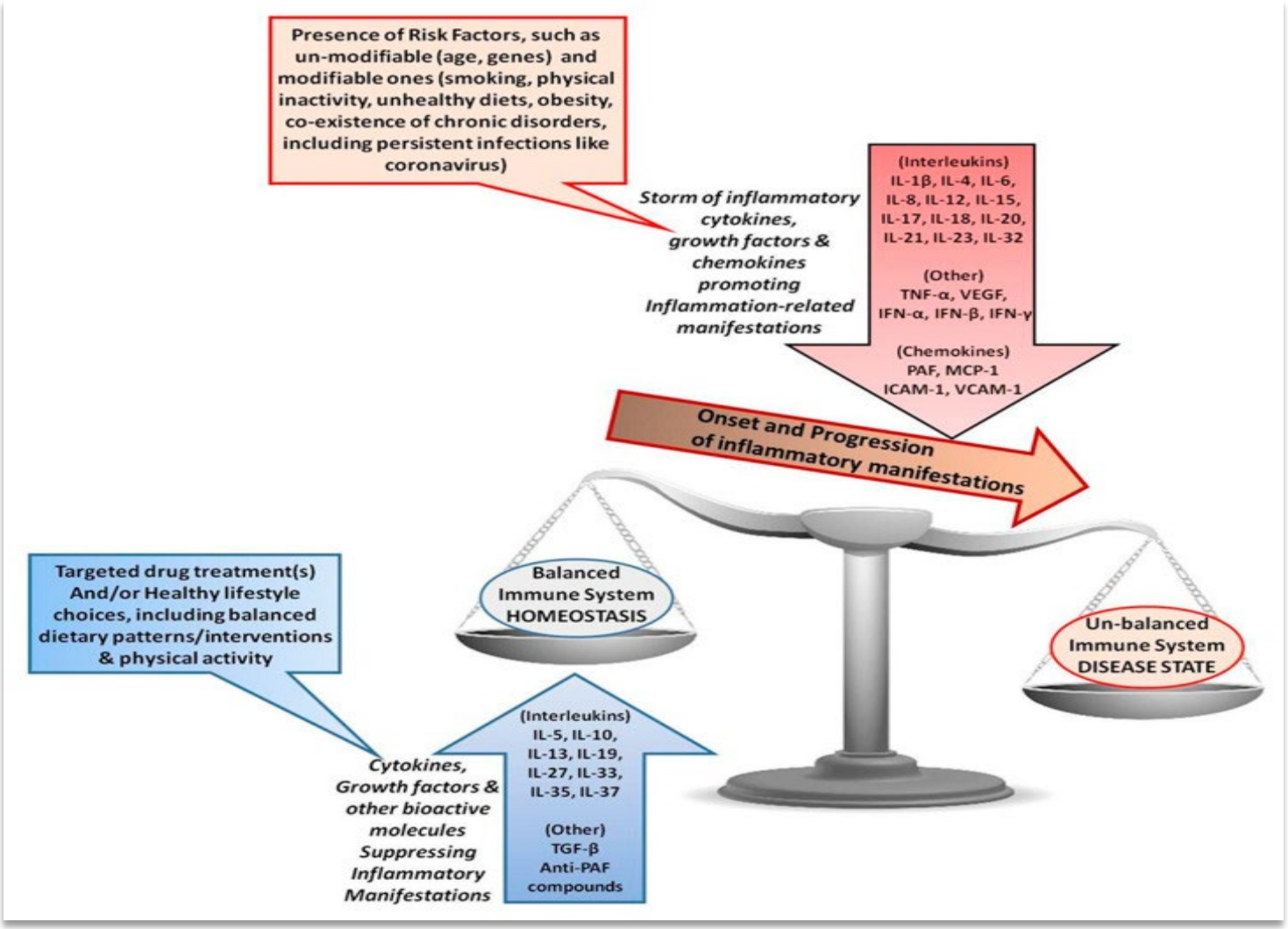


I coronavirus (CoV) sono un'ampia famiglia di virus respiratori che possono causare malattie da lievi a moderate, dal comune raffreddore a sindromi respiratorie come la MERS (sindrome respiratoria mediorientale) e la SARS (sindrome respiratoria acuta grave). Sono chiamati così per le punte a forma di corona che sono presenti sulla loro superficie.

La **COVID-19**[, acronimo dell'inglese *Corona VIrus Disease 19*, conosciuta anche come **malattia respiratoria acuta da SARS-CoV-2** o **malattia da coronavirus 2019**, è una malattia infettiva respiratoria causata dal virus denominato SARS CoV2 appartenente alla famiglia dei coronavirus. I primi casi sono stati riscontrati in Cina nella Città di Wuhan durante la pandemia di COVID-19 del 2019-2020.

A novembre 2020 il suo tasso apparente di letalità è del 2,47%

representation of the inflammatory molecules involved in infection



Zabetakis I et al . Nutrients.Covid 19-the inflammation link and the role of nutrition 2020 May 19; 12(5).

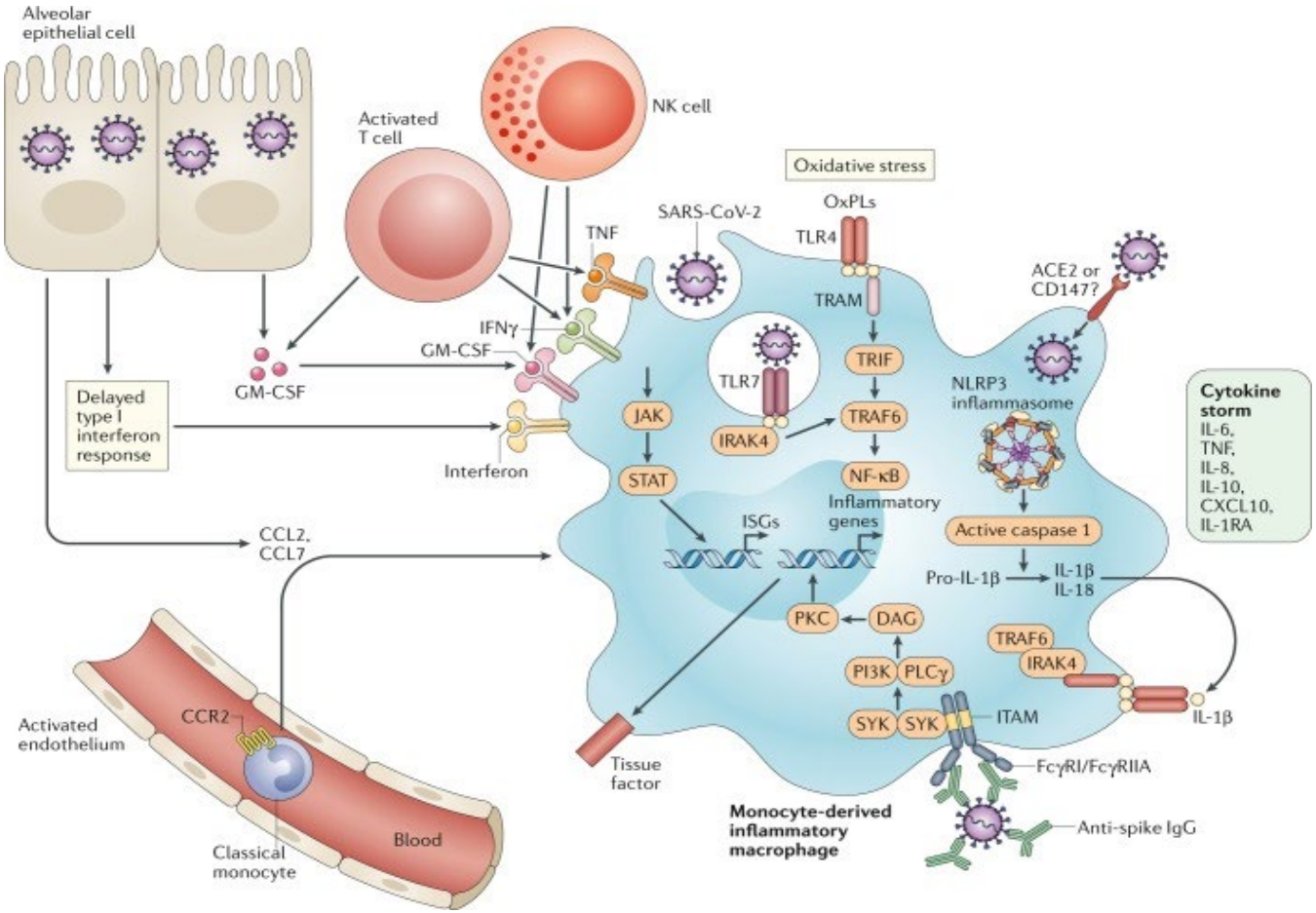
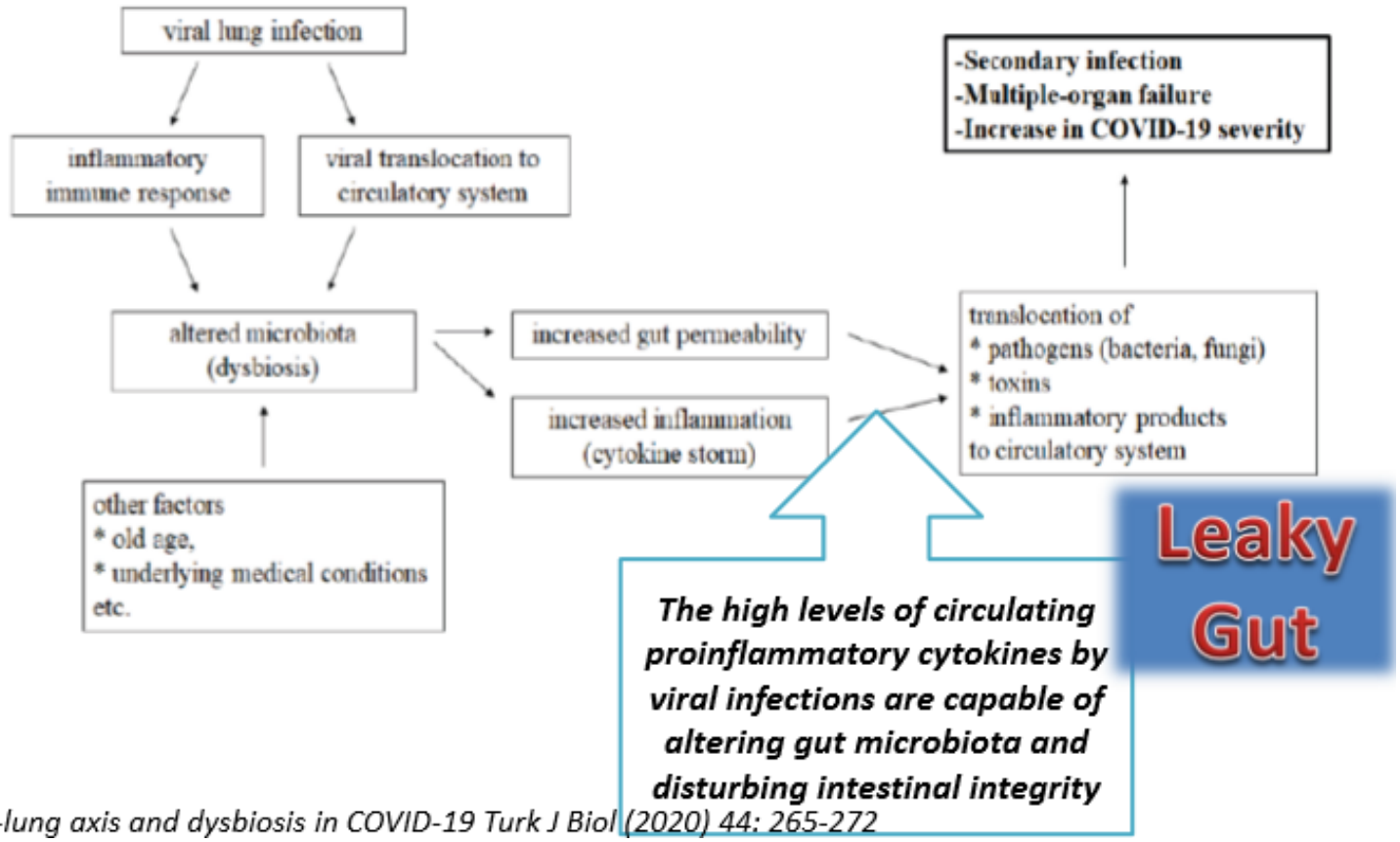


Fig. 1

Possible pathways contributing to hyperactivation of monocyte-derived macrophages and hyperinflammation in COVID-19.

Pathological **inflammation** in patients with **COVID-19**: a key role for monocytes and macrophages.
Merad M, Martin JC.
Nat Rev Immunol. 2020 Jun;20(6):355-362. doi: 10.1038/s41577-020-0331-4. Epub 2020 May 6.

Microbiota e **ASSE INTESTINO-POLMONE**



Gut-lung axis and dysbiosis in COVID-19 Turk J Biol (2020) 44: 265-272

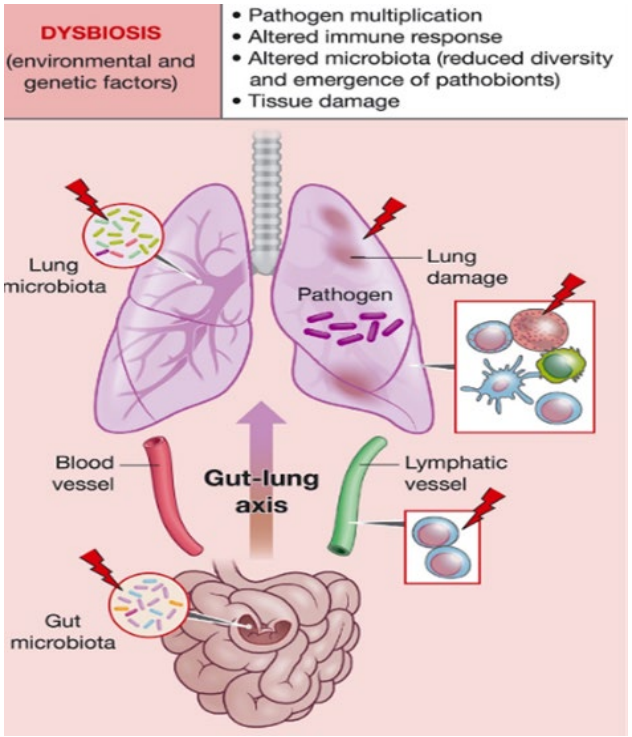
Microbiota e **ASSE INTESTINO-POLMONE**

Recenti evidenze attribuiscono al microbiota intestinale la possibilità di influenzare il comportamento funzionale del microbiota polmonare attraverso una sua diretta **immunomodulazione** **(GUT-LUNG AXIS)**

GUT-LUNG AXIS

- corrisponde alle **interazioni bidirezionali** tra microbiota polmonare e intestinale
- cruciale per mantenere un sistema immune funzionale e modulare una serie di reazioni immuni in entrambi i distretti.
- sia la **disbiosi** che le **infezioni batteriche e virali** **possono alterare questa delicata omeostasi**

- Uno studio cinese effettuato su campioni fecali di **15 soggetti** ospedalizzati infetti da SARS-CoV-2, confrontati con soggetti sani o affetti da altre polmoniti, dimostra come il microbioma fecale di pazienti COVID-19 sia notevolmente alterato, anche dopo la risoluzione dei sintomi e la clearance virale



Dumas A. The role of the lung microbiota and the gut–lung axis in respiratory infectious diseases. Cell. Microbiol. 2018

Zuo T et al **Alterations in Gut Microbiota of Patients With COVID-19 During Time of Hospitalization**, Gastroenterology (2020)

Il microbiota intestinale è modulato dalla dieta, supplemento alle attuali terapie di routine , in particolare anziani e immunocompromessi, infettati dal virus SARS-Cov2

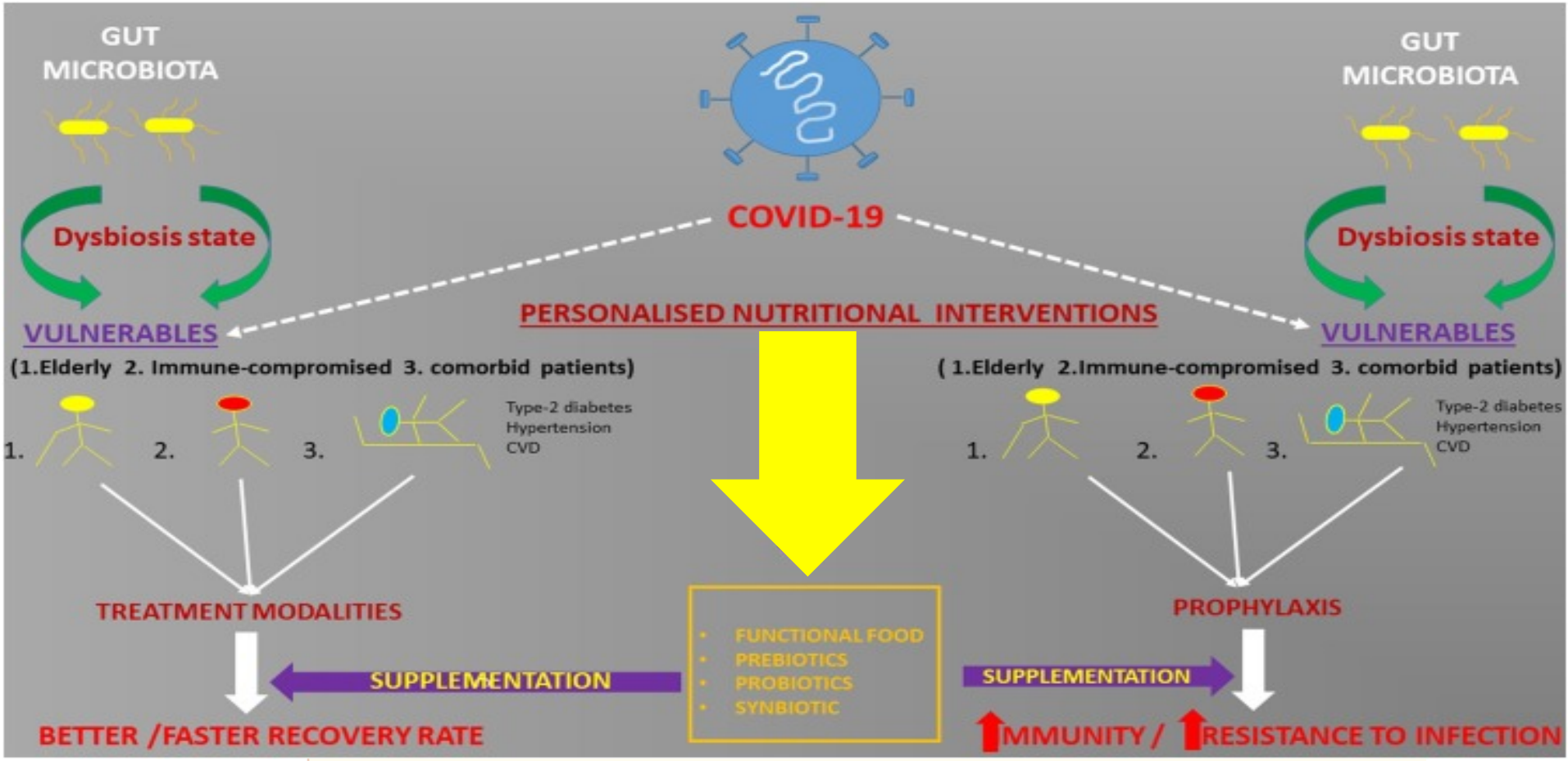


Fig. 2

Personalized nutritional strategies as prophylaxis and in treatment supplementation.

Personalized nutritional strategies may be adopted for the Covid-19 vulnerable sections both as prophylaxis and supplementation to current treatment modalities.

Debojyoti Dhar et al 'Gut microbiota and Covid-19- possible link and implication.. Virus Res.285 : 2020

Componente funzionale	Alimento funzionale che lo contiene	Potenziali benefici
Carotenoidi Alfa e beta carotene Luteina Licopene Vitamina A – precursore carotenoidi	Carote, zucca e vegetali di colore giallo/arancio Vegetali di colore verde Pomodoro	Neutralizza i radicali liberi-immunomodulante
Vitamina E Vitamina C Vitamina D	Frutta secca, oli vegetali, cereali integrali, legumi Frutta e verdura rossa, gialla e arancio Verdura a foglia verde scura Pesci grassi, uova, latte fortificato	Azione antiossidante - immunomodulanti
Polisaccaridi non amidacei Prebiotici -Fibre alimentari solubili ed insolubili probiotici	Crusca, avena, orzo Frutta e verdura e legumi yogurt e prodotti caseari	Azione sul microbiota intestinale e sul sistema immunitario
Acidi grassi Acidi grassi omega3 a catena lunga (DHA-EPA)	Pesce azzurro, salmone ed altri pesci grassi, semi di lino o di chia	Azione antinfiammatoria - immunomodulanti
Zinco, selenio	Cereali integrali, frutta, carne e pesce	Attraverso i fattori di trascrizione modulano la risposta infiammatoria, riducono lo stress ossidativo - immunomodulanti
Composti fenolici Antocianidine Catechine Flavoni Lignani Tannini	Frutta The verde Agrumi EVOO, pomodori,cipolle rosse Lino, carote, ,EVOO, cavoli rossi , fragole, frutti di bosco Mirtilli, frutti rossi, uva rossa, vino	Neutralizza i radicali liberi - immunomodulanti

Figure 1. Schematic diagram showing interactions between selected dietary constituents, the immune system, and viral infection.

Calder PC. **Nutrition, immunity and COVID-19** bmjnph (2020)

Iddir M et al. **Strengthening the immune system and reducing inflammation and oxidative stress through diet and nutrition: considerations during the COVID-19 crisis**. **Nutrients. (2020) 12**

antioxidants

MDPI

Hypothesis

Flavonoids Activation of the Transcription Factor Nrf2 as a Hypothesis Approach for the Prevention and Modulation of SARS-CoV-2 Infection Severity

Patricia Mendonca and Karam F. A. Soliman *

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Abstract: The Nrf2-Keap1-ARE pathway is the principal regulator of antioxidant and phase II detoxification genes. Its activation increases the expression of antioxidant and cytoprotective proteins, protecting cells against infections. Nrf2 modulates virus-induced oxidative stress, ROS generation, and disease pathogenesis, which are vital in the viral life cycle. During respiratory viral infections, such as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), an inflammatory process, and oxidative stress of the epithelium lining cells activate the transcription factor Nrf2, which protects cells from oxidative stress and inflammation. Nrf2 reduces angiotensin-converting enzyme 2 (ACE2) receptors expression in respiratory epithelial cells. SARS-CoV2 has a high affinity for ACE2 that works as receptors for coronavirus surface spike glycoprotein, facilitating viral entry. Disease severity may also be modulated by pre-existing conditions, such as impaired immune response, obesity, and age, where decreased level of Nrf2 is a common feature. Consequently, Nrf2 activators may increase Nrf2 levels and enhance antiviral mediators' expression, which could initiate an "antiviral state", priming cells against viral infection. Therefore, this hypothesis paper describes the use of flavonoid supplements combined with vitamin D3 to activate Nrf2, which may be a potential target to prevent and/or decrease SARS-CoV-2 infection severity, reducing oxidative stress and inflammation, enhancing innate immunity, and downregulating ACE2 receptors.

frontiers in Medicine

MINI REVIEW
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May Polyphenols Have a Role Against Coronavirus Infection? An Overview of *in vitro* Evidence

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The coronavirus infection is constantly diffusing worldwide and the incidence of death is dramatically increasing, representing one of the greatest disasters in human history. Nowadays, no effective therapeutic approaches have been licensed, despite the rising interest of the scientific research in this specific field, and the daily growing number of publications, while the need to find novel strategies is urgent. Evidence in the literature reported the antiviral activity of polyphenols, the largest class of bioactive compounds in nature. Interestingly, a limited number of studies investigated the efficacy of polyphenols from different raw materials, directly against coronaviruses. The present manuscript aimed to report this evidence and provide a viewpoint on the possibility to use it as a start point for the development of novel natural approaches against this viral infection, eventually designing further appropriate researches.

Keywords: SARS-CoV2, COVID-19 pandemic, polyphenols, antiviral, nutraceutical

nutrients

MDPI

Review

Strengthening the Immune System and Reducing Inflammation and Oxidative Stress through Diet and Nutrition: Considerations during the COVID-19 Crisis

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check for updates

Abstract: The coronavirus-disease 2019 (COVID-19) was announced as a global pandemic by the World Health Organization. Challenges arise concerning how to optimally support the immune system in the general population, especially under self-confinement. An optimal immune response depends on an adequate diet and nutrition in order to keep infection at bay. For example, sufficient protein intake is crucial for optimal antibody production. Low micronutrient status, such as of vitamin A or zinc, has been associated with increased infection risk. Frequently, poor nutrient status is associated with inflammation and oxidative stress, which in turn can impact the immune system. Dietary constituents with especially high anti-inflammatory and antioxidant capacity include vitamin C, vitamin E, and phytochemicals such as carotenoids and polyphenols. Several of these can interact with transcription factors such as NF-kB and Nrf-2, related to anti-inflammatory and antioxidant effects, respectively. Vitamin D in particular may perturb viral cellular infection via interacting with cell entry receptors (angiotensin converting enzyme 2), ACE2. Dietary fiber, fermented by the gut microbiota into short-chain fatty acids, has also been shown to produce anti-inflammatory effects. In this review, we highlight the importance of an optimal status of relevant nutrients to effectively reduce inflammation and oxidative stress, thereby strengthening the immune system during the COVID-19 crisis.

nutrients

MDPI

Review

COVID-19: The Inflammation Link and the Role of Nutrition in Potential Mitigation

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Abstract: The novel coronavirus disease (COVID-19) pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has engulfed the world, affecting more than 180 countries. As a result, there has been considerable economic distress globally and a significant loss of life. Sadly, the vulnerable and immunocompromised in our societies seem to be more susceptible to severe COVID-19 complications. Global public health bodies and governments have ignited strategies and issued advisories on various handwashing and hygiene guidelines, social distancing strategies, and, in the most extreme cases, some countries have adopted "stay in place" or lockdown protocols to prevent COVID-19 spread. Notably, there are several significant risk factors for severe COVID-19 infection. These include the presence of poor nutritional status and pre-existing noncommunicable diseases (NCDs) such as diabetes mellitus, chronic lung diseases, cardiovascular diseases (CVD), obesity, and various other diseases that render the patient immunocompromised. These diseases are characterized by systemic inflammation, which may be a common feature of these NCDs, affecting patient outcomes against COVID-19. In this review, we discuss some of the anti-inflammatory therapies that are currently under investigation intended to dampen the cytokine storm of severe COVID-19 infections. Furthermore, nutritional status and the role of diet and lifestyle is considered, as it is known to affect patient outcomes in other severe infections and may play a role in COVID-19 infection. This review speculates the importance of nutrition as a mitigation strategy to support immune function amid the COVID-19 pandemic, identifying food groups and key nutrients of importance that may affect the outcomes of respiratory infections.

Table 1. Selected studies associating dietary constituents with viral or other infection risk and symptoms.

Table 1. Selected studies associating dietary constituents with viral or other infection risk and symptoms.

Constituent	Study Design	Description	Main Findings	Ref
Proteins	Human cross-sectional study	23 elderly patients subjected to influenza vaccination and measurement of their nutrient status.	Total protein status (determined by questionnaire) was slightly lower ($p < 0.05$) in influenza vaccine non-responders vs. responders (66 vs. 69 g/L). Similar results were found for iron, proposing that immune-response was compromised by poor nutrient status in this elderly population.	Fulop et al., 1999 [78]
	Animal study (mice)	Group receiving a diet adequate in protein (AP; 18% of energy) vs. group receiving very low protein (VLP; 2%) for 3 weeks. Both groups were subjected to influenza infection.	Higher mortality in the VLP group ($p < 0.001$) vs. AP, 25 d post infection (p.i.). The AP vs. the VLP group showed a decreased virus titer by day 9 ($p < 0.001$) and an efficient clearance within 12 d ($p < 0.001$). %age of NK cells in lungs were reduced ($p < 0.01$) in VLP vs. AP group with higher ($p < 0.001$) neutrophil proportions in response to infection with influenza virus in each group, respectively. The VLP group had less influenza NP-specific $CD8^+$ T cells at days 8 ($p < 0.05$), 15 ($p < 0.05$), and 30 ($p = 0.001$). Switching VLP to AP diet improved $CD4^+$ and $CD8^+$ T cell subset levels on days 8 ($p < 0.01$), 15 ($p < 0.01$), and 30 ($p < 0.01$) and increased IFN-γ ($p < 0.001$).	Taylor et al., 2013 [79]
	Animal study (mice)	Mycobacteria-infected mice fed 2% protein diet vs. control group receiving 20% protein diet for up to 30 days.	100% of malnourished mice (fed 2% protein diet) succumbed to *M. tuberculosis* infection within 66 d p.i. Malnourished mice had a reduced expression of IFN-γ, TNF-α, and iNOS in the lungs. A mortal infection of *M. tuberculosis* in malnourished animals was reversed upon re-feeding with the 20% protein diet.	Chan et al., 1996 [80]
Lipids	Animal study (mice)	Mice infected with H5N1 virus treated with omega-3 polyunsaturated fatty acid-derived lipid mediator protectin D1 (PD1), given 3 times i.v.	H5N1 virus pathogenicity decreased with higher levels of PD1. PD1 inhibited virus replication ($p < 0.001$) via influenza virus nucleoprotein mRNA expression at day 2 p.i. PD1 treatment within 12 h improved the survival ($p < 0.05$) and pathology of severe influenza ($p < 0.001$).	Morita et al., 2013 [81]
	Animal study (mice)	Influenza A virus (IAV) infected mice fed with a high-fat (HF; 40% of energy) vs. low-fat (LF; 12% of energy) diet for 10 weeks.	HF mice were more susceptible to respiratory disease after IAV infection than were LF mice, with lower blood oxygen saturation ($p < 0.05$) and an increase in pulmonary viral load ($p < 0.05$). Decreased pro-inflammatory response to IAV in the serum of HF mice vs. LF for IL-6, IFN-γ, IFN-α, and IP-10 ($p < 0.05$). Antiviral response in the heart was reduced in HF mice after IAV infection, where higher viral loads were detected in the hearts of HF vs. LF mice ($p < 0.05$). Correlation between IAV-infected HF mice and viral infection in the heart, left ventricular mass, and thickening of the left ventricular wall, characterized by increased HIF-1a compared to LF group ($p < 0.05$).	Siegers et al., 2020 [82]
	Animal study (mice)	High-fat diet (HFD) 60% or regular-fat diet (RFD) 5% fat, administered to 4-week old mice for 10 weeks. Influenza vaccination was conducted after 10 weeks.	Functionality of macrophages was diminished after diet-induced obesity ($p < 0.001$) via lower CD86-expressing macrophages, lower release of IL-6 and TNF-α, increased Th1 cell subpopulation, and reduced proportion of Treg cells. Vaccination-induced antibody production was decreased in animals receiving HFD vs. RFD ($p < 0.001$)	Cho et al., 2016 [83]
Lipids, carbo-hydrates	Animal study (mice)	Feeding mice with ketogenic, i.e., low carbohydrate diet (KD, 90% fat) vs. standard high-fat (60% fats, 20% lipids) diet (HFD) for 7 d before influenza A virus (IAV) infection.	KD protected mice from lethal IAV infection and disease ($p < 0.05$) compared to HFD-fed mice. KD resulted in an expansion of T-cells ($p < 0.001$), compared with the HFD group. KD-fed mice had better blood O_2 saturation ($p < 0.001$). KD diet was significantly related to improved antiviral resistance ($p < 0.001$).	Goldberg et al., 2019 [84]
Fiber	Prospective human cohort study	Study evaluating dietary fiber intake versus health outcomes. n = 219,123 men and 168,999 women, aged 50–71 y; 9 y follow-up.	Consumption of dietary fiber correlated with lowered mortality from infectious and respiratory diseases. Per 10 g/d increase in dietary fiber, the multivariate RRs for infectious and respiratory diseases were 0.66 (CI: 0.52–0.84) and 0.82 (CI: 0.74–0.93) in men and 0.61 (CI: 0.44–0.85) and 0.66 (CI: 0.56–0.78) in women, respectively.	Park et al., 2011 [85]
	Animal study (mice)	High-fiber diet (HFD)-fed mice vs. control group, subjected to viral influenza infection	Intake of dietary fiber improved influenza by prolonged survival ($p < 0.05$) and ameliorated clinical scores ($p < 0.031$). After 7 d, HFD-fed mice with high-dose infection had better lung function as shown by reduced pulmonary resistance ($p > 0.01$) and enhanced compliance in response to methacholine ($p > 0.01$). In HFD-fed mice, the excessive neutrophil influx into the airways was inhibited by blunted levels of CXCL1, produced by lung monocytes and macrophages ($p < 0.001$) vs. controls. Increased antiviral immunity by dietary fiber through $CD8^+$ T cell activation ($p < 0.01$) vs. controls. (HFD)-fed mice showed enhanced adaptive immunity by changed $CD8^+$ T cell metabolism ($p < 0.05$).	Trompette et al., 2018 [86]
	Animal study (mice)	Fiber-free diet group (LFD) vs. control group for up to 40 d, subjected to infection with mucosal pathogen *Citrobacter rodentium*	Low fiber intake resulting in increases in mucus-degrading microbiota and enhanced lethal colitis cases ($p < 0.05$).	Desai et al., 2017 [87]
Vitamin A	Meta-analysis of RCTs.	Effects of vitamin A supplementation on acute lower respiratory tract infections (LRTI). 10 studies (n = 33,179 children).	Though some individual studies demonstrated a positive effect of vitamin A supplementation on LRTI, in pooled analyses, there was no effect of vitamin A supplementation on acute LRTI incidence or prevalence of symptoms.	Chen et al., 2008 [88]

Table 1. *Cont.*

Constituent	Study Design	Description	Main Findings	Ref
Vitamin D	Meta-analysis of RCTS.	Assessment of vitamin A supplementation on acute respiratory infection. 5 studies (n = 2177 children (1067 children under intervention, 1110 control).	Faster recovery from infection symptoms due to vitamin A, no differences in the placebo group: fever: OR: 0.03, CI: −0.10–0.17, oxygen requirement: OR: −0.08, CI: −0.31–0.16; increased respiratory rate: OR: −0.09, CI: −0.38 –0.19; hospital stay duration: OR: −0.06, CI: −0.52–0.40.	Brown and Roberts 2004 [89]
	Retrospective human study	Study determining mortality patterns of COVID-19 and associated factors: Special focus on vitamin D status. 2 cohorts of 780 cases with confirmed infection of SARS-CoV-2 in Indonesia.	Vitamin D status is strongly associated with COVID-19 mortality (adjusted for age, sex, and comorbidity) ($p < 0.001$). Individuals with insufficient vitamin D status were ca. 12.6 as likely to die (OR 12.55).	Raharusun et al., 2020 [90]
	Meta-analysis of RCTs	Assessment of vitamin D supplementation on respiratory tract infections. 5 clinical trials (n = 964 participants).	Significantly fewer respiratory tract infections were observed following a vitamin D supplementation. (OR: 0.58, CI: 0.417–0.812). In clinical trials there were beneficial effects on events of infections due to vitamin D supplementation in children (OR: 0.58, CI: 0.416–0.805) and adults (OR: 0.65, CI: 0.472–0.904).	Charan et al., 2012 [91]
	Meta-analysis of RCTs	Assessment of vitamin D supplementation on respiratory tract infection (RTI). 11 placebo-controlled studies (RTCs) (n = 5660 patients).	Vitamin D had protective effects against RTI (OR: 0.64; CI, 0.49- 0.84). This was more pronounced by individual daily dosing compared to bolus doses (OR = 0.51 vs. OR = 0.86, $p = 0.01$).	Bergman et al., 2013 [92]
Vitamin E	Humans, RCT	Assessment of vitamin E supplementation and community acquired pneumonia. n = 7469 men 50–69 y.	Lower incidence of pneumonia in individuals receiving vitamin E supplements (RR: 0.28; CI: 0.11–0.69).	Hemila, 2016 [93]
Vitamin C	Meta-analysis of RCTs	Supplementation trials with vitamin C and observation of cold symptoms. 9 randomized controlled trials (n = 5500) in children (3 months–18 y of age).	Daily supplementation in vitamin C with extra doses reduced the time of having a common cold (mean difference = −0.56, 95% confidence interval (CI) (−1.03, −0.10)), fever (mean difference = −0.45, 95% CI (−0.78, −0.11)) and chest pain (mean difference = −0.40, 95% CI (−0.77, −0.03)).	Ran et al., 2018 [94]
B-vitamins	Human cross-sectional study	Observation of inflammation markers and nutrient status. HIV infected participants (n = 180 men, 134 women; 18–60 y).	Serum CRP concentrations were inversely associated with increased vitamin B intake including niacin, pyridoxine, and cobalamin (p for trend $p < 0.01$, $p < 0.05$ and $p = 0.037$, respectively) in men. Trends were observed in women.	Poudel-Tandukar et al., 2016 [95]
Zinc	Human double-blinded RCT	Patients in the zinc group (n = 50) received lozenges (13.3 mg of zinc gluconate) as long as they showed cold symptoms. Patients in the placebo group (n = 50) received 5% calcium lactate pentahydrate.	A faster decrease of the cold symptoms (median, 4.4 d vs. 7.6 d; $p < 0.001$), e.g., fewer days with coughing (median, 2 d compared with 4.5 d; $p < 0.05$), hoarseness (2 and 3 d; $p < 0.05$), headache (2 and 3 d; $p < 0.05$), nasal congestion (4 and 6 d; $p < 0.01$), and sore throat (1 and 3 d; $p < 0.001$) were found in the intervention group, supplemented with zinc, in comparison with the placebo group.	Mossad et al., 1996 [96]
Iron	Animal trial (Wistar rats)	Administration of low iron diet (4–5 mg powder), medium iron diet (15 mg), control group (35 mg) and normal iron intake diet group. At week 4, rats received injection of inactivated porcine influenza vaccine (HswIN1).	Following immunization, anemic rats exhibited decreased ($p < 0.05$) antibody titer vs. controls. Antibody synthesis was preserved in moderate iron deficiency, but was hampered by severe anemia.	Dhur et al., 1990 [97]
Selenium	Human randomized, double-blinded RCT	Evaluation of response to influenza vaccine. 12-weeks follow up. n = 119 (50–64y) 6 intervention groups: 50, 100, or 200 mg/be/day, meals with Se-enriched onions (50 mg se/day), unenriched onions and placebo.	SEPS1 mRNA (marker of inflammation) increased ($p < 0.05$) after one week of vaccine administration, being dependent on the dose of Se per each intervention arm.	Goldson 2011 [98]
Polyphenols	Animal study (mice)	Evaluation of effect of polyphenol extract from *Cistus Incanus* on avian influenza Aviurs (H7N7). Inbred female Balb/c and C57Bl/6 mice at the age of 6–8 weeks.	The polyphenol extract helped mice to not contract avian influenza, and to not alter bronchiole epithelial cells, as well as to keep constant the body temperature and the gross motor activity.	Droebner et al., 2007 [99]
Carotenoids	Longitudinal study with infants	Observation of β-carotene in plasma. 194 HIV-infected infants.	β-Carotene was related to increased risk of death during HIV infection (OR: 3.16, CI: 1.38 to 7.21; $p < 0.01$).	Melikian et al., 2001 [100]

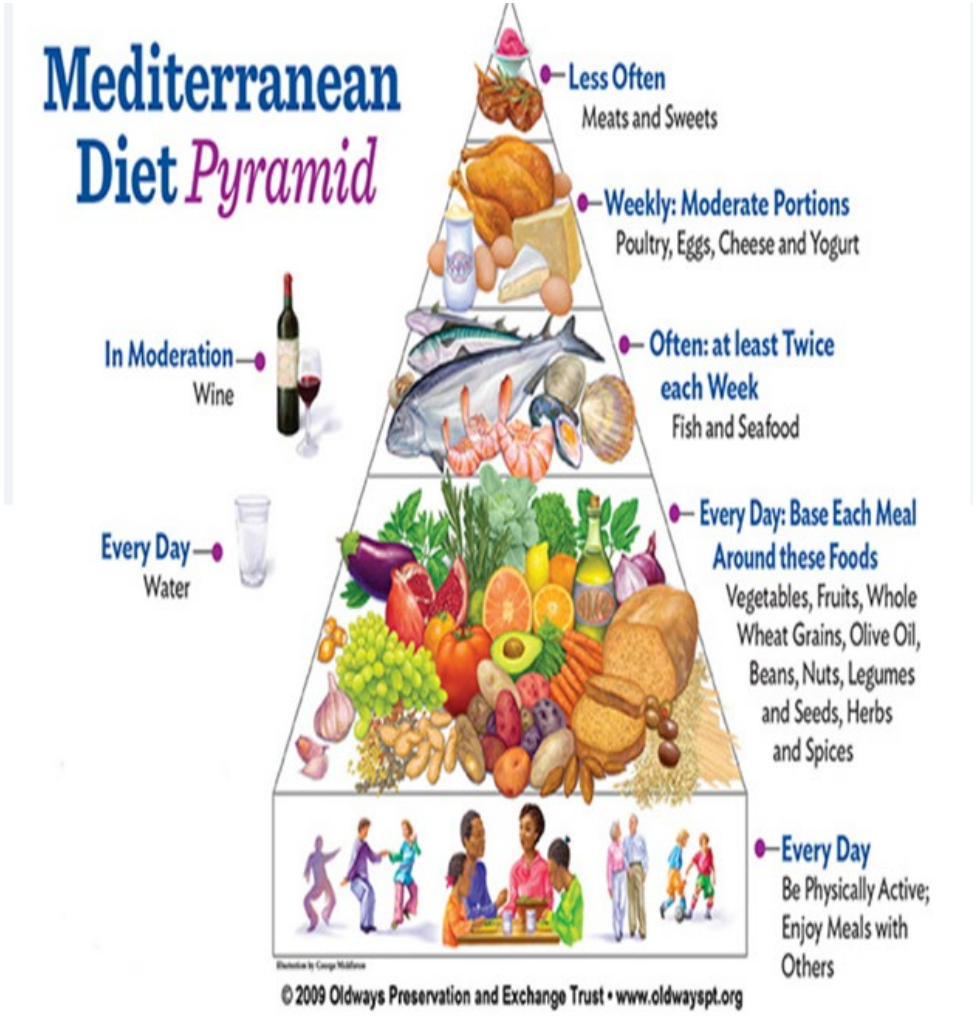
Abbreviations: AP: adequate protein; Balb/c: albino mouse strain; CD-86: cluster of differentiation 86; CRP: C-reactive protein; CXCL1: The chemokine (C-X-C motif) ligand 1; H5N1- influenza A virus subtype H5N1; H7N7: influenza A virus subtype H7N7; HF: high fat; HFD: high-fat diet; HFD: high-fiber diet; HswIN1: swine influenza virus; IAV: influenza A virus; IFN-α/γ: interferon α/γ; IL6: interleukin 6; LF: low-fat; LRTI: lower respiratory tract infections; iNOS: inducible nitric oxide synthase; KD: ketogenic diet; NK: natural killer cells; P1- protectin D1; RCT: randomized controlled trial; RFD: regular-fat diet; RTI: respiratory tract infection; SEPS1: selenoprotein S; TNF-α: Tumor necrosis factor alpha; VLP: very-low protein.

Gli studi indicano che il regime alimentare con impatto positivo sulla funzione immunitaria è un regime che contiene :

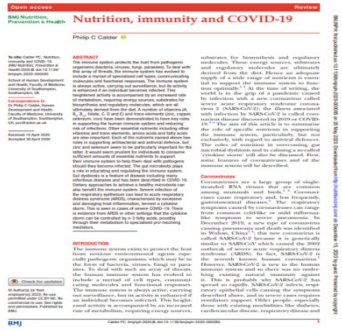
- **quantità adeguate di proteine**, in particolare tra cui glutammina, arginina e aminoacidi a catena ramificata (BCAA)
- **contenuto adeguato di omega-3** rispetto a acidi grassi saturi, grassi trans e omega-6,
- **basso contenuto di zuccheri raffinati**
- **contenuto adeguato di micronutrienti** tra cui vitamina A, vitamina D, vitamina C, vitamina E, vitamine del gruppo B, zinco, selenio e ferro,
- Alto contenuto in alimenti funzionali contenenti sostanze **sostanze antiossidanti ed antiinfiammatorie**
- **Contenuto adeguato di fibra**

Iddir M et al. Strengthening the immune system and reducing inflammation and oxidative stress through diet and nutrition: considerations during the COVID-19 crisis. **Nutrients. (2020) 12:1562.**

La dieta mediterranea esercita effetti antinfiammatori e immunomodulatori



Il potere antiinfiammatorio, antiossidante, immunomodulante associato ai componenti della dieta mediterranea può essere di fondamentale importanza per ridurre la suscettibilità a sviluppare e/o ridurre la gravità delle infezioni, comprese le malattie COVID-19


Nutrition, immunity and COVID-19

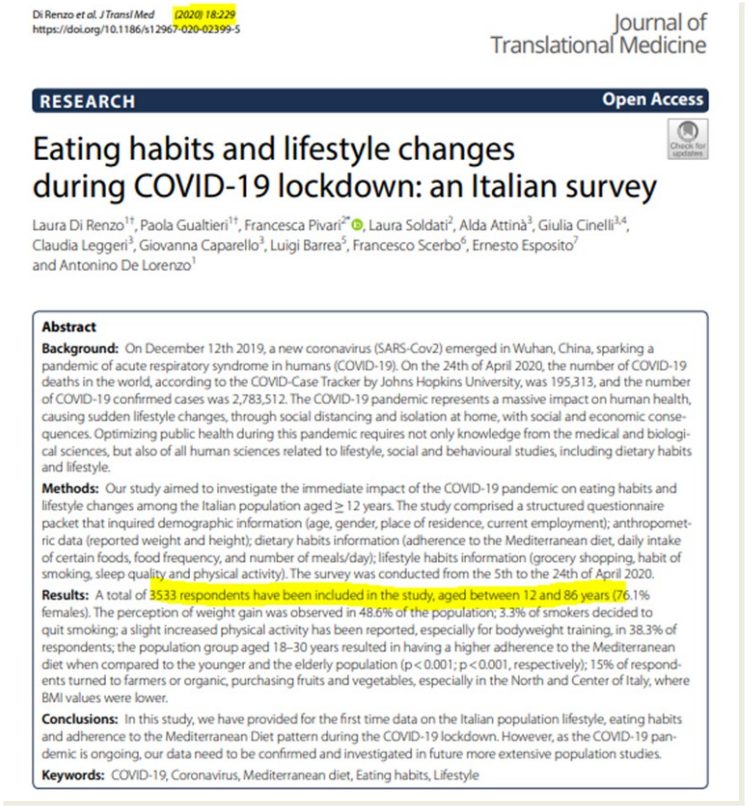
Philip C Calder

Calder PC. **Nutrition, immunity and COVID-19** bmjnph (2020)

Fattibilità della DM ai tempi del COVID ??

Aderenza al modello dietetico mediterraneo durante la pandemia COVID-19.

Una recente indagine condotta su **3.533 individui italiani fascia di età 12-86 anni** ha evidenziato che, durante il lockdown, gli italiani hanno prestato attenzione alla dieta mediterranea, mantenendo un'elevata qualità nutrizionale soprattutto al **Nord e Centro Italia**.



Di Renzo *et al. J Transl Med* (2020) 18:229
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Journal of Translational Medicine

RESEARCH Open Access

Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey

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Abstract

Background: On December 12th 2019, a new coronavirus (SARS-Cov2) emerged in Wuhan, China, sparking a pandemic of acute respiratory syndrome in humans (COVID-19). On the 24th of April 2020, the number of COVID-19 deaths in the world, according to the COVID-Case Tracker by Johns Hopkins University, was 195,313, and the number of COVID-19 confirmed cases was 2,783,512. The COVID-19 pandemic represents a massive impact on human health, causing sudden lifestyle changes, through social distancing and isolation at home, with social and economic consequences. Optimizing public health during this pandemic requires not only knowledge from the medical and biological sciences, but also of all human sciences related to lifestyle, social and behavioural studies, including dietary habits and lifestyle.

Methods: Our study aimed to investigate the immediate impact of the COVID-19 pandemic on eating habits and lifestyle changes among the Italian population aged ≥ 12 years. The study comprised a structured questionnaire packet that inquired demographic information (age, gender, place of residence, current employment); anthropometric data (reported weight and height); dietary habits information (adherence to the Mediterranean diet, daily intake of certain foods, food frequency, and number of meals/day); lifestyle habits information (grocery shopping, habit of smoking, sleep quality and physical activity). The survey was conducted from the 5th to the 24th of April 2020.

Results: A total of 3533 respondents have been included in the study, aged between 12 and 86 years (76.1% females). The perception of weight gain was observed in 48.6% of the population; 3.3% of smokers decided to quit smoking; a slight increased physical activity has been reported, especially for bodyweight training, in 38.3% of respondents; the population group aged 18–30 years resulted in having a higher adherence to the Mediterranean diet when compared to the younger and the elderly population ($p < 0.001$; $p < 0.001$, respectively); 15% of respondents turned to farmers or organic, purchasing fruits and vegetables, especially in the North and Center of Italy, where BMI values were lower.

Conclusions: In this study, we have provided for the first time data on the Italian population lifestyle, eating habits and adherence to the Mediterranean Diet pattern during the COVID-19 lockdown. However, as the COVID-19 pandemic is ongoing, our data need to be confirmed and investigated in future more extensive population studies.

Keywords: COVID-19, Coronavirus, Mediterranean diet, Eating habits, Lifestyle

Take home message 1 — Prevenzione primaria

Tabella patologie preesistenti

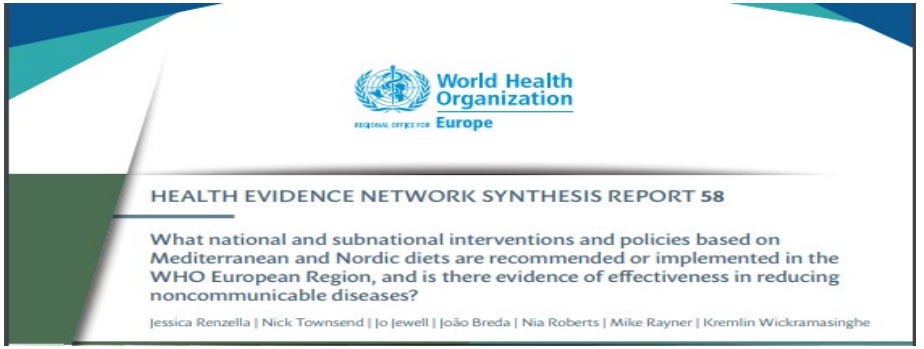
Patologie	Donne		Uomini		Totale	
	N.	%	N.	%	N.	%
Cardiopatia ischemica	495	22,9	1002	30,7	1497	27,6
Fibrillazione atriale	556	25,8	754	23,1	1310	24,2
Scompenso cardiaco	409	18,5	480	14,5	889	16,4
Ictus	265	12,3	350	10,7	615	11,3
Ipertensione arteriosa	1477	68,4	2095	64,2	3572	65,9
Diabete mellito-Tipo 2	582	27,0	1013	31,1	1595	29,4
Demenza	679	31,4	538	16,5	1217	22,4
BPCO	293	13,6	640	19,6	933	17,2
Cancro attivo negli ultimi 5 anni	348	16,1	587	18,0	935	17,2
Epatopatia cronica	90	4,2	163	5,0	253	4,7
Insufficienza renale cronica	413	19,1	731	22,4	1144	21,1
Dialisi	33	1,5	79	2,4	112	2,1
Insufficienza respiratoria	151	7,0	215	6,6	366	6,8
HIV	1	0,0	11	0,3	12	0,2
Malattie autoimmuni	135	6,3	103	3,2	238	4,4
Obesità	222	10,3	335	10,3	557	10,3
Numero di patologie	**N.**	**%**	**N.**	**%**	**N.**	**%**
0 patologie	45	2,1	132	4,0	177	3,3
1 patologia	239	11,1	455	13,9	694	12,8
2 patologie	376	17,4	635	19,5	1011	18,6
3 o più patologie	1499	69,4	2040	62,5	3539	65,3

ISTITUTO SUPERIORE DI SANITÀ

Gruppo della Sorveglianza COVID-19

La **prevenzione primaria** era uno dei cardini della legge di riforma sanitaria del 1978 (la legge 833) : « La prevenzione è fondamentale per la tutela della salute»

l'OMS definisce l'alimentazione determinante di salute in grado di influenzare la comparsa delle Malattie croniche non trasmissibili



Dietary Guidelines for Americans 2015 -2020

Take home message 2 **Potenziale strategia terapeutica**

Metabolism Clinical and Experimental xxx (xxxx) xxx

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journal homepage: www.metabolismjournal.com

Mediterranean diet as a nutritional approach for COVID-19

The Mediterranean diet, having high antioxidant, anti-inflammatory, and potential antimicrobial and immunomodulatory properties, is a promising and relatively easy method to attenuate the severity of COVID-19 infection. Therefore, there is a critical and imminent need for

Published: October 17, 2020 • DOI: https://doi.org/10.1016/j.metabol.2020.154407

In conclusion, the Mediterranean diet may represent a potential strategic therapeutic approach to address both short- and long-term conditions associated with COVID-19 infection and severity and improve mortality and the overall well-being of affected populations. From a pub-

Take home message 3

Sostenibilità dieta mediterranea

Agenda 2030 Sviluppo Sostenibile delle Nazioni Unite FAO – UNESCO - Ministero Salute

Sostenibilità ambientale

impatto ambientale di circa il 60 % inferiore rispetto ad una alimentazione di tipo nordeuropeo o nordamericano (+ prodotti agro-alimentari - prodotti animali)

Sostenibilità sociale

convivialità, identità sociale , tradizioni agro-eno-gastronomiche

Sostenibilità economica

Spesa familiare Scegliere prodotti della Dieta Mediterranea permette di risparmiare 7 euro a settimana : per un carrello Mediterraneo si spendono 46,27 settimana contro i 53,55 euro di quello standard (dati secondo Osservatorio Waste Watcher -Last Minute Market/Swg)

Spesa sanitaria. Una maggiore aderenza delle abitudini alimentari al modello mediterraneo migliora lo stato di salute generale della popolazione, che si traduce in una diminuzione della spesa sanitaria nazionale.


GRAZIE!!!!!!