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v.2.0

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To: Sundhedsministeriet, Sundhedsstyrelsen og Statens Serum Institut
cc: Arbejdsgruppen for Tg v/FVST
cc: **Whom it may concern.**

IMPORTANT

Re: Evidence that Covid provokes onset of Acute Toxoplasmosis

It has become exceedingly clear that co-infection and co-morbidities is the leading cause of death in Covid-19 cases and that a major factor in this is Toxoplasma and acute toxoplasmosis.

Toxoplasma is – by far – the most prevalent infection among humans, and its distribution and proliferation **are clearly mirrored in Covid-19 cases, pathology and fatalities**.

This document is a supplement to our previous document on "Covid/Toxoplasma correlations" of March 13th. Please refer to this for a comprehensive list of the clear overlap in symptoms. For further information on Toxoplasma, please see this article.

A. **There is a 100% overlap in symptoms between Covid-19 and acute toxoplasmosis**

B. **There is a 100% overlap in outcomes/lethality. Toxoplasma infects the brain, heart, muscle tissue and lungs**

C. **All medications suggested effective in treatment of Covid-19 has a documented effect on Toxoplasma infections**

D. **There is a perfect correlation in Covid-19 observed reduction in CD8+ T cells and the onset of acute toxoplasmosis**

E. **There is NO protocol in place that tests patients and/or deceased for presence of Toxoplasma tachyzoites/acute toxoplasmosis – why?**

A + B. Overlap in severe/lethal symptoms (supplement to table I in document from March 2020)

Outcomes in severe/lethal Covid	Covid (data from peer-reviewed article in The Lancet)	Effective against Toxoplasma? (all quotes from peer-reviewed publications)
Sepsis	100% of non-survivors	"Collectively, these data demonstrated that chronic infection with **T. gondii is a critical factor for sepsis**.."
Respiratory Failure & ARDS	98% of non-survivors	"Diffuse lung injury may result as a complication of disseminated toxoplasmosis" "Toxoplasmic pneumonitis leading to fatal **acute respiratory distress syndrome**"
Acute Cardiac Injury	59% of non-survivors	".. myocarditis linked to a recent toxoplasmosis infection is reported, with consistent MR-scan images. **Clinically significant heart injury may be a rare, but life-threatening, manifestation of toxoplasmosis**" "Cardiac toxoplasmosis was common in this necropsy series.."
Acute Kidney Injury	50% of non-survivors	"The above examples clearly illustrate the **close association between toxoplasmosis and renal function** and the need to fully screen renal transplant patients for toxoplasmosis."
Hypoproteinemia	37% of non-survivors	"Biochemical abnormalities during the acute phase of (Tg) illness include **hypoproteinemia** and hypoalbuminemia."
Acidosis	Been reported in several Covid-19 cases	"Toxoplasma pneumonitis (..) can be associated with respiratory insufficiency, **metabolic acidosis**, disseminated intravascular coagulation, refractory septic shock, encephalitis, and myocarditis"
Hypoxia	Been reported in several Covid-19 cases	"Toxoplasma activates host **hypoxia** inducible factor-1 by cytoplasmic trapping"

Outcomes in severe/lethal Covid	Covid (data from peer-reviewed article in The Lancet)	Effective against Toxoplasma? (all quotes from peer-reviewed publications)
		"Toxoplasmic pneumonitis can present with cough, dyspnea, **hypoxia**, and diffuse bilateral or localized infiltrates."
"Cytokine storm"	?	"Blockade of IFN-gamma; prevented arterial hypotension and prolonged the host lifespan by reducing the cytokine storm." "Chronic T. gondii infection intensifies local and systemic Th1 cytokines as well as nitric oxide production, which reduces systolic and diastolic arterial blood pressures after sepsis induction, thus predisposing the host to septic shock…"

C. Comparison of treatments that has been successfully tested on Covid-19. Virtually all of them affects Toxoplasma

There are interesting overlaps in the treatments administered for Covid, and the same treatments effects on Toxoplasmosis.

Covid medication/treatment	Effective against Toxoplasma? (all quotes from peer-reviewed publications)
Lopinavir/ritonavir	"Lopinavir/ritonavir caused **parasitological improvement in acute toxoplasmosis**. Both forms prevented the egress of the tachyzoites, led to apoptosis and autophagy (..), disruption of the parasitophorous vacuole and the nanotubular network."
Several studies suggest that Vitamin D and C reduces risk for Covid	".. Toxoplasma infection was associated with **vitamin D deficiency**." "Our findings indicated that vitamin C & E and selenium are

Covid medication/treatment	Effective against Toxoplasma? (all quotes from peer-reviewed publications)
	effective in **reduction of parasite burden..”**
Chloroquine	“...**chloroquine**, mitomycin C, fenbendazole, daunorubicin, atropine, and cerivastatin of FDA molecules **were identified as "hits" with ≥ 40 percent anti-parasite action**.”
Nitazoxanide (NTZ)	“In the acute infection model, NTZ at 100 and 150 mg/kg **significantly reduced the number of brain cysts** by 78 and 87% compared to the infected untreated controls and **reduced the mortality** rate to 24 and 20%, respectively, compared with 44% in the infected untreated control.”
Ivermectin	“These results indicate that **ivermectin significantly inhibited replication** of the tachyzoites of T. gondii RH strain.”
Spiramycin	“**Spiramycin** Treatment of Toxoplasma gondii Infection in Pregnant Women **Impairs the Production and the Avidity Maturation of T. gondii**-Specific Immunoglobulin G Antibodies”
IFN-gamma blocade	"Blockade of IFN-gamma; **prevented arterial hypotension and prolonged the host lifespan by reducing the cytokine storm**."

D. Covid patients has a markedly decrease of CD8+ T cells, these cells are essential for control of Toxoplasma infection. Toxoplasma can provoke a “cytokine storm” under the right conditions

- “We showed that the total number of NK and CD8+ T cells **was decreased markedly in patients** with SARS-CoV-2 infection”

- “CD8 T cells are **essential for control of *Toxoplasma gondii* infection**. Once activated they undergo differentiation into short-lived effector and memory precursor effector cells”

- It's been mentioned that "Covid interacts with CD147" and that "exhaustion of T cells" plays an important role in the pathology. Both are clearly mirrored in acute toxoplasmosis:
  - "Recent studies have revealed that **in late chronic toxoplasmosis T lymphocytes become progressively exhausted and this dysfunction is suggested to be responsible for the reactivation of latent infection**, which may **result in a life-threatening disease** in immunocompromised individuals"

.... seems as if Covid somehow provokes Toxoplasma, that thereafter becomes target for a T-cell attack:

"New evidence shows cytotoxic T cells can identify, invade, and destroy targets of large mass like Toxoplasma gondii tissue cysts"

Given the above has merit, there are effective treatments available.

E. There is NO protocol in place that tests patients and/or deceased for presence of Toxoplasma tachyzoites/acute toxoplasmosis – why?

We have made inquiries as to illuminate if testing for Toxoplasma/Toxoplasmosis is part of the current protocol – and we understand that it is NOT. I.e. nowhere is Toxoplasma testing conducted, neither in the early or late stages. There are no post-mortem tests either.

As we have clearly demonstrated there is a 100% overlap – ***that should mandate obligatory testing for Toxoplasmosis.***