

OXYTOCIN, A POSSIBLE TREATMENT FOR COVID-19?  
EVERYTHING TO GAIN, NOTHING TO LOSE

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Abstract

After comparing the morbidity patterns of COVID-19 infections, variations of oxytocin levels and some properties of the neurohormone oxytocin, the authors put forward their hypothesis that oxytocin might constitute a safe, inexpensive and readily available treatment for this disease.

**Key words:** COVID-19, pandemic, treatment, oxytocin, immune system, inflammation

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Currently, there is no simple explanation for the differences in pattern of morbidity and mortality seen in COVID-19 infection between subgroups of the population and there is no safe effective treatment available. However, several clinical trials are underway investigating new treatments, for example, antiviral drugs.

Some of the risk factors for morbidity and death of COVID-19 – first emerging in China – have been shown to be consistent across different countries (Li et al., 2020).

1. Young people are less severely affected than the elderly people,
2. people showing metabolic risk factors are more severely affected than those without,
3. females are less severely affected than males,
4. pregnant women are not necessarily more vulnerable to the disease than non-pregnant women,
5. further African Americans are more at risk for serious disease than are other American groups.

Therefore, according to these parameters, the highest risk groups would be the elderly, the chronically ill, men and African Americans.

Indeed, the patterns of plasma oxytocin levels are the following:

1. Higher in the young than in the elderly (Elabd et al., 2014).
2. Higher in metabolically fit individuals compared to

those demonstrating metabolic risk factors (Yuan et al., 2016).

3. Higher in women than in men (Marazziti et al., 2019).
4. Higher in pregnant women than in non-pregnant women (Prevost et al., 2014).
5. Race differences in oxytocin levels have been identified with lower levels in African Americans (Grewen, Light, Mechlin & Girdle, 2008).

The authors therefore hypothesize that higher levels of oxytocin might be associated with reduced morbidity and mortality in COVID-19 infection.

Oxytocin is a nonapeptide produced in the hypothalamus, acting as a neuropeptide in different brain areas and as a hormone and paracrine substance in peripheral organs. It was originally described as the hormone regulating labor and lactation, but has been shown to exert important behavioral and physiological functions including potent anti-stress and restorative effects (Uvnäs-Moberg, Handlin, Kendall-Tackett, Petersson, 2019).

It has colloquially been referred to as the “love hormone”, given its role in social interaction and bonding (MacDonald & MacDonald, 2010).

If, indeed, variations in the oxytocin levels in part explain the difference in severity of the disease in the groups mentioned above, and in particular, if low levels of endogenous oxytocin are linked to severe disease there may be reason to suggest that administration of oxytocin could

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be used for the treatment of COVID-19 patients.

The high mortality of COVID-19 is due to an exorbitant inflammatory response, which may result in acute respiratory distress syndrome (ARDS) and multiorgan damage. It is therefore pivotal to bring this hyperinflammation under control. Different anti-inflammatory drugs may be deployed including glucocorticoids but in many cases the treatment is limited by their general immunosuppressive effects.

Also from this perspective it is interesting that oxytocin may exert potent anti-inflammatory effects in humans (Clodi et al., 2008) and may have a therapeutical potential against cardiovascular disease (Buemann & Uvnäs-Moberg, 2020). In contrast to glucocorticoids oxytocin may exert supportive (Stanić et al., 2016) and stimulatory (Macciò, Madeddu, Chessa, Panzone, Lissoni & Mantovani, 2010) impacts on lymphocytes.

Anti-inflammatory mechanisms may be involved in the organ protective properties of oxytocin as demonstrated in mice, where it has been shown to mitigate acute lung injury and multiorgan failure (İşeri, Sener, Saglam, Gedik, Ercan & Yegen, 2005). In addition, restorative effects of the peptide may add to this effect.

As far as implementation is concerned, it is easily available as exogenous oxytocin is administered every day in most hospitals worldwide to induce and enhance labor.

To implement the potential treatment of COVID-19 patients with oxytocin throughout the world would not take months, but just weeks or even days as soon as reliable data are available documenting positive effects of the peptide.

An additional and equally important aspect to be considered is that it is possible to increase endogenous oxytocin levels by behavioral modifications or interventions. This could be implemented immediately, even before using oxytocin as an exogenous drug (Marazziti et al., 2006).

If the administration of exogenous oxytocin would reduce progression and mortality of COVID-19 thousands of lives might be saved.

It should be noted that oxytocin is a natural hormone that is safe enough to be routinely administered in women in obstetric settings throughout the world. The risks of its use are small or negligible and the pharmacokinetics are well known (Uvnäs-Moberg et al., 2019).

There are many possible areas of research which could be used to confirm or refute this hypothesis: a. to assess oxytocin blood levels in COVID-19 patients with different levels of severity; b. and amongst at-risk groups; c. to carry out double blind placebo-controlled trials with oxytocin.

In conclusion, the authors believe that the variations in morbidity and mortality patterns observed in COVID-19 infection, are consistent with the proposal that lack of oxytocin might play a significant role in the expression of pathophysiology of COVID-19. There is sufficient experimental evidence that oxytocin possesses anti-inflammatory effects also in humans. In addition, it may stimulate the adaptive immune response and enhance restorative mechanisms which may accelerate the recovery of COVID-19 patients.

Oxytocin is a safe and inexpensive drug which is used and available in most hospitals. The authors suggest that it should be considered for clinical investigation for the treatment of COVID-19 by itself or in combination with other drugs.

(We have everything to gain and nothing to lose).

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