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Could veganism help us avoid epidemic and pandemic diseases?

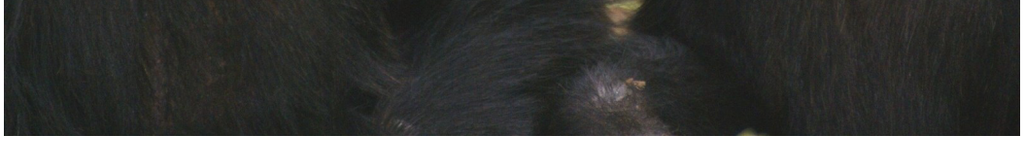
By Olivia Stocker

The nature of food production has escalated dramatically. From simple subsistence farming in more primitive times to the globalized mass trade of stock by the ton. More and more this vast production of food includes an escalation of a growing favorite on the menu, meat (including fish). The escalating demand for this product has restructured landscapes, heated the planet to record levels and changed the ecology of ancient ecosystems. Recently the link between meat consumption and enhanced global warming has had a lot of attention, as it should, but could there also be a connection between the meat industries and the development of viral diseases? If so, is this link strong enough to prove that a diet low or rid of meat could potentially help us avoid any future outbreaks? This is what I hope to explore in this piece. My investigations have unearthed some shocking truths which I hope will help tie the two together.

A brief background on how viruses spread to new hosts

Novel (new) viruses of humans are mainly sourced from animals (zoontic) and are difficult to detect before they transfer. Zoonotic diseases are significantly harmful and highly transmissible within a population. Zoonosis has occurred on both epidemic (contained within a community or continent) and pandemic (global spread) scales within the human population over the course of our history and have become a more regular ordeal. Zoonotic diseases can be passed on directly from a wild host (reservoir) or from a domestic host which has been in regular contact with an infected wild host. In some cases wild hosts have a peaceful relationship with their inflicting viruses due to the longevity of their relationship. This is common among species such as bats.

When viruses are 'spilled over' onto a new host population they draw a potential to cause highly transmissible diseases, which provides the reasoning for our current pandemic. In nature it is rare for viruses to spread to new hosts. But a damaged environment and close regular contact with wild and domestic viral reservoirs dissolves natural barriers, and poses higher risks for these 'spillovers' to occur. Only from repetitive interactions of humans with infected animals or animal reservoirs (host populations where viruses reside usually without doing any harm) will viruses gain time to evolve an ability to penetrate a human cell. We have to understand why and how these interactions occur to move forward and the key is the production, procurement and consumption of meat by humans, in all its forms.



(Photography: Eva Schuster)

A novel virus can travel between humans in a variety of different ways once established. In order to gain this situation in the first place it needs regular points of entry into the human body in order to evolve and become a fully formed human virus. In some cases there hadn't been enough viral spillovers to the human population to cause a more widespread disease. For example, the of H5N1 influenza (bird flu) caused hundreds of deaths from spillovers directly from the chicken reservoirs but didn't occur enough to allow the virus an ability to spread efficiently from human-human. The death toll would have been a lot higher had the virus been given a bit more time.

Exposure to animal viruses via the animal's bodily fluids (e.g. saliva, blood) is the main mode a virus can 'spillover' to a human. For example, HIV-1 and HIV-2 developed in humans as a result of blood from primates, infected with SIV viruses, entering the open wounds and cuts of bush meat hunters. SIVs had been circulating among primate populations a long time before the development of HIV, this clearly shows that the hunting of bush meat had increased to dangerous levels. Most viral transfers (spillovers) don't amount to contagious disease and usually end with the recipient directly infected. However, regular exposure to the virus (in this case the primate hosts) leaves room for viral evolution, thus an epidemic is born. The global transmission of HIV is a prime example, and one of the first widespread warnings, of what the over-exploitation of animals for meat can result in. Although the control of HIV is much improved by use of antiretroviral therapy, it still remains incurable and it's progression into AIDS (acquired immune deficiency syndrome) still takes into full force in areas where the therapy isn't as widely available.

Destructive exploits of the sea draws light to disease

It would be unfair and incorrect to assume that the actions of poor countries, in the pursuit of essential protein, is the sole cause for the spread of viruses into the global population. Foreign players pursuing high quotas are putting pressure on the resources of poor countries which results in acts of desperation. A solid example of this is the EU's exploits in the Gulf of Guinea, a 2.35 million km body of water off the west coast of Africa. Rich and bountiful were these waters, swollen with sardinellas, yellowfin tuna, swordfish, European anchovy and bigeye tuna. With the 1950s tuna crash in their own waters behind them, the EU was eager to take a share of this abundant resource.

The Gulf of Guinea is dominated by foreign trawlers, all of which have signed off various monetary-based agreements with each corresponding west African country, which allows them access to the fisheries. In the EU's case the agreements are termed sustainable fishing partnership agreements (SFPA) which set a more sustainable example by giving money to the countries and in return they'll only trawl a sustainable surplus amount. They joined this with a common fisheries policy (CFP) in 1984 which had it's own policies on conserving marine fish stocks and fishing responsibly. It is important to add that this CFP was reviewed and improved in 2014 to include protecting seas outside of EU waters.

But studies have shown that the EU has been undermining their own policies in respect to west African trawling and some countries within it have even been partaking in illegal, unregulated and unreported (IUU) fishing activities. Fees payed to west African countries in the SFPAs can amount from €600,000 – €61.6 million depending on the tonnage taken but these figures are only a fraction of what the fisheries are worth. On average Europe pays only 8% of the total value of fish caught to west African countries. This means that they are surpassing the maximum sustainable yield and over-exploiting the fish stocks in addition to not paying a fair share. Not only this but the money traded in this agreement doesn't reach the pockets of the 9 million local inhabitants which rely both directly and indirectly in employment in fisheries or related industries.

Of course the countries which enter the SFPAs have a responsibility to ensure the deals are sustainable but they are primarily attracted to the money offered to them by large vessels, despite lacking the appropriate infrastructure to monitor them. In any case the EU have written guidelines and rules which paint them as ambassadors for good and sustainable trade thus they have a sole responsibility to carrying out these deals fairly. Of course China and Russia play a part in the depletion of these fisheries. China dominates an estimated 47% of fleets in the Gulf, and pay an even smaller fee at 4% of total catch value to the countries. They predominantly target sardinellas, a West African staple, in large quantities to be shipped to their fishmeal mills, a product used in livestock feed. But China doesn't include policies for sustainable fishing in their agreements with countries. Their exploits are equally or more destructive to the people and environment but they don't have CPFs or SFPAs which they continuously undermine, which the EU evidently does on a criminal scale.

In addition, EU vessels are heavily subsidized, with a large proportion of the money going towards making their ships larger and more efficient at hauling up shoals of fish in great quantity. This completely contradicts the CFPs they withstand in their own countries, which have seen an increase in once exploited species such as the north Atlantic cod. Evidently they've managed this come back of fish stocks in their home waters through the act of moving their exploitative operations to west Africa. EU countries have even been reported fishing in parts of the Gulf where there have been no agreements with countries. For example, in 2017 it was released that 19 vessels from Portugal, Spain, Greece and Italy spent 31,000 hours in the waters of Equatorial Guinea and The Gambia, organised through private illegal deals with the countries. In another incident, attorney general Kelve Nobre Cavalho remarks how authorities in São Tomé (small island within Gulf of Guinea) boarded a Spanish tuna boat to find a large haul of blue sharks, headed for China, fins already cut. When reading through the fleet's permit there was a loop-hole found. Where it stated 'tuna' as the reason for fishing, further down it also said 'highly migratory species'. They had purposefully included this to deceptively fish for what they wanted.

The increasing food insecurity in the Gulf of Guinea in response to over-exploitation of stock has meant traditional fisherman have had to travel farther out to sea in search of fish. Their small, ill-equipped boats are not designed for long journeys and there is a high risk of being run over by large vessels or capsized from harsh sea conditions. If they do make it back, their catch is meager. The ratio of money received by EU fisherman compared to west African fisherman is 7:1. In Guinea-Bissau, one of the hardest hit countries by the trawling, the daily income has been reduced to $1 a day. Penniless and desperate if they don't turn to the forest to hunt a new source of food and income, they have to make the dangerous journeys across seas to find work. Most ironically many have been facing journeys to Europe. As governments lack the funding to monitor fishing activity, foreign vessels are able to plunder where they want in order to feed the huge seafood demand in Europe and as a result the locals are forced to make terrifying decisions.

(Photography: Christian Thompson)

With a decline in their primary source of income and protein, many people are driven to target a new resource. A census lead by environmental scientist, Justin Brashares, sort out to understand the link between this decline in fish supply and the demand for bush meat, focusing on Ghana. More than half of the population of Ghana reside within 100 km from the Gulf of Guinea, the target of over-exploitation on the West African coast. The census was conducted over a 30 year period, from 1970-1998 and found that the biomass of mammals in the forest decreased, and tonnage of bush meat sold at markets increased during periods of decline in fish availability. This has been termed the 'Protein Limitation Hypothesis'. Hunting pressure was also shown to have no relation to weather conditions or the oil industry, further demonstrating the value of this link. The census has proved evident that fishing efforts by large foreign fishing vessels has driven the exploitation of another resource by desperate locals and can be said about other west African countries, who are equally as reliant on fish. It could be further interpreted that the fish imported to EU countries and the meat consumption in China has an indirect association with the rise in bush meat demand in west Africa.

Furthermore, this overall mass production and consumption of meat could potentially have led to the higher rates of cross contamination of pathogens between animals and humans which occurs in bush meat hunting. It's safe to question whether the foreign vessels behind the wheel of these deleterious fishing practices could be partly responsible for the various epidemic outbreaks which have come out of west and central African forests. An example of which is the deadly Ebola disease was first discovered in 1974, where the worst outbreaks ever recorded have taken place in the 21st century. This corresponds with the decline of fisheries being at it's highest in this century and where many west African countries were affected by the disease. In a 2013 outbreak, 5,000 people died of Ebola in Liberia, one of the countries worst effected by fishing trawlers. In addition, the HIV-1 and HIV-2 pandemics could also be linked with the decline in fish, seeing the scale of exploitation and the EU trawler presence in the Gulf of Guinea which can be dated back to the 1950s.

Globalization and trade of domestic and wild animals

The demand for bush meat has not only been high in Africa but now there are small markets for it in Europe and the US as well. People travelling from Africa and South America to Paris, Switzerland, Geneva and Zurich have been discovered smuggling pangolins, small carnivores, and primates, because there is now a demand in Europe for for tropical cuisine, even though it is illegal. An estimate of 40 tons alone in Zurich and Geneva. In 2015 an estimate of 7,500 tons of illegal meat entered the EU, destined for the black marget. Not only is this an unsustainable practice, but it is aiding the potential transmission of viruses directly to our doorsteps.

Globalization of markets and a surge to supply the population with their craving for meat has encouraged large scale importing and exporting of live animals. This trade in animal goods poses a very high risk of cross-species transfer of microbes and creates an easy route of entry for a virus. In 2017 two billion live chickens, pigs, cattle, sheep and goats were loaded onto ships or lorries and sent on long voyages for up to six weeks. Operations such as this has been going on since 1967 where the figure showed 130 million live animals were sent on journeys, this shows the rate has risen dramatically. This movement is partaken by countries all over the world, with EU countries being the biggest exporters and countries in Asia being the biggest importers. For example, chickens were the most traded species, 4 million chickens were sent to Thailand from the Netherlands alone. Evidently, countries worldwide lack the capacity to contain enough livestock to feed the growing demand for meat. The long, crammed voyages are not only terribly unethical and cruel but they are also dangerously effective tools to allowing zoonotic viruses to evolve.

In order to crack down on this we need to first focus on the big players in the industry of animal trade. Together the US and China dominate large proportions of the world's poultry production (44.1%), pork (58.6%) and beef (31.1%). These figures show that these countries play a significant role in intensive meat production. This in-turn encourages the crossover of viruses from wild animals to domestic animals and thus domestic animals to the human population. An example of this can be seen in the SARS outbreak of 2003 where a novel coronavirus, SARS-CoV, was spread to encroaching pig farms via cross contamination with bats (viral reservoir) in the Guangdong province of southern China. There is also an argument that civets were the secondary hosts to receive the SARS-like virus from bats, but eventually it did reach pigs. The US and China are not just responsible for dominating the production of livestock but are integral partners in the trade of wild animals. China exports 58.6% of the world's wild animals and the US imports 64%. Of US imports 27% are wild mammals deeming the route of transmission into a human population that much easier. The higher the demand for meat becomes the further the intensification and trade of animals will have to be in order to meet the demand. A quarter of all global deaths are caused by infectious disease, 60% of which are zoonotic, with most of those (70>) caused by pathogens of wildlife. The trade of live and domestic animals are clearly putting the world at risk of yet another pandemic.

Habitat destruction in the name of meat fuels the frenzy

Trees are the ancient barriers which separate humans from dangerous viruses. The deforestation of forests and development of land to make room for livestock and feed crops, breaks this natural mechanism, exposing humans and domestic animals to viral reservoirs (e.g. bats). For example, in the late 90's, an area the size of Pennsylvania was burned to the ground in Indonesia to be land for agricultural use. With fruit trees gone, fruit bats were forced to move on in search of food. They eventually settled in Malaysian orchards, leaving trails of partially consumed fruits. These fruits were consumed by pigs from farms and of course became infected. The preparation and consumption of the infected pork meat then passed this new evolved virus (NiV) onto humans causing Nipah virus. This spread fast through Asia causing severe brain hemorrhaging and hundreds of deaths. Not only was this outbreak a result from the consumption of livestock but the settlement of the virus itself was encouraged by the destructive practices involves in producing more livestock. Clearly a dangerous cycle.

(Photography: Pixabay)

Deforestation for agriculture hasn't just encouraged the arrival of novel viral diseases on the small scale but has been feeding the progression of diseases borne of other organisms, which have been around for decades. Malaria is a wide spread disease caused by Plasmodium parasites causing an estimated 200 million new cases each year (World Health Organization, 2019). Malaria is spread by mosquitoes which are vectors to a wide variety of viral diseases such as Zika, Dengue and West Nile. A study by Dr. Amy Vittor set out to uncover the effects of deforestation on the biting rate by malaria-vectoring mosquitoes in Peru. The study showed that mosquitoes bit 278 times more frequently in deforested areas than in-tact forests. The treeless spaces are warm, sun exposed and accumulated puddles which would once be absorbed by trees. In other words, the perfect breeding ground for mosquito larvae. This trend has been seen throughout the Amazon where malaria cases have coincided with deforestation practices. One study showed that 1,600 square kilometers (300,000 football fields) of deforested rain forest was linked to 10,000 cases of malaria in the Amazon. This study may have been centered on a parasitic disease, but mosquitoes are very efficient vectors of viral diseases as well, which underlines this study's relevance. The production of soy and cattle in South America is mainly destined for out-of-country destinations such as the US, Europe and China, the soy is used as feed for factory farmed livestock. Evidently now a link between meat production and disease is starting to hit home.

We are lucky that momentarily SARS-CoV-2 isn't causing the high death rates which have been seen in outbreaks of other viruses in the past. However, the tendency for a virus to travel fast and evolve quickly draws an obstacle in the matter in the development of treatment and preventative measures (aka vaccinations). So don't we want to stop them from crossing to us in the first place? With a global population on the rise and a growing demand for meat, poor nations may be at the front lines of the planets response but the viral spread is clearly starting to affect all of us. Instead of frantically searching for the culprit species where Covid-19 originated, all we need to do is look down at our plates and question what is there. Of course I don't mean solutions like veganism is the ultimate cure for a pandemic. That would require more study. However, the globalized mass consumption and trade of meat is dangerous and we can take personal steps to push for a more sustainable relationship with it. What I am saying is eating a lot less and keeping informed about where it's from is clearly an incredibly effective thing you can do. I have supplied enough evidence to prove that, and if not for the planet, for yourself and the future. Disease, evidently, goes hand in hand with meat, wherever you source it. Everything is connected. Whether you eat a chicken in the UK or Australia or India. The power is all ours to make the right decisions.

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