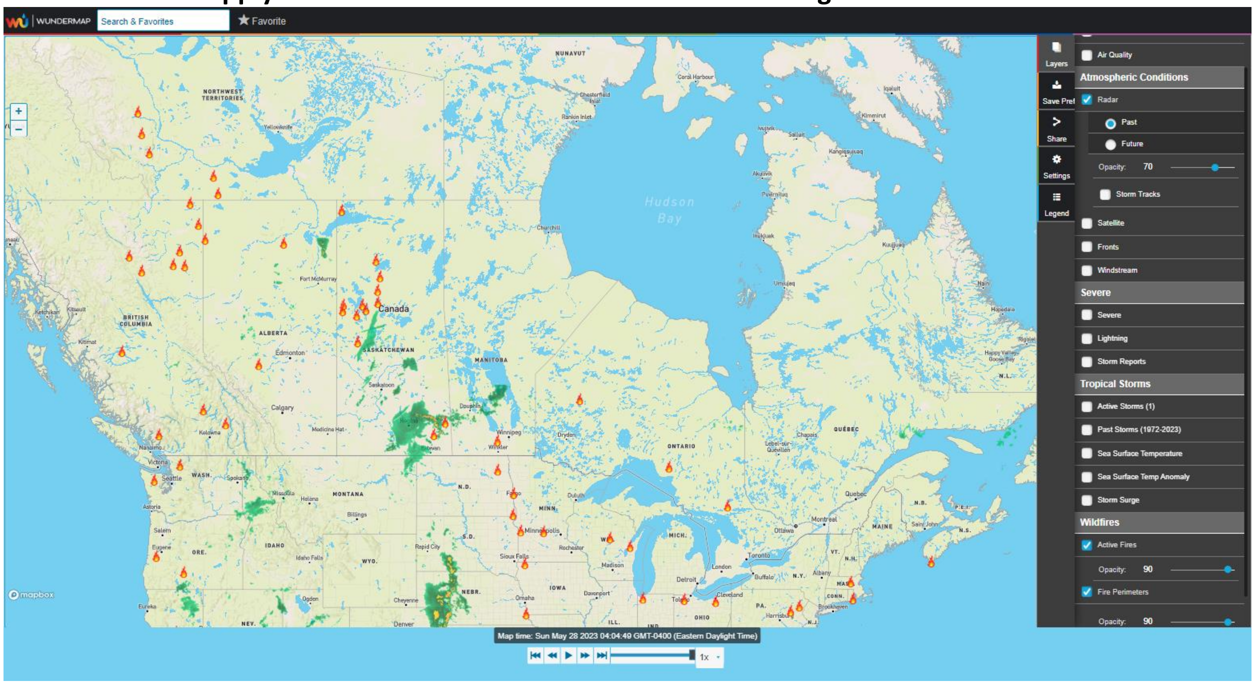
**Assault on Canada with fire releases black carbon and is highly toxic---the area that are on fire are where the food supply chain would be the water content  and wild game that feed the natives**




**And this is moving eastward toward where the native reserves are---and other non indigenous communities ---where there environment is also being carcinogenically exposed**

**Soot is composed of a complex mixture of organic compounds which are weakly absorbing in the visible spectral region and a highly absorbing black component which is variously called "elemental", "graphitic" or "black carbon"**. The term elemental carbon has been used in conjunction with thermal and wet chemical determinations and **the term graphitic carbon suggests the presence of graphite-like micro-crystalline structures in soot as evidenced by Raman spectroscopy**.

**Black carbon, or soot, is part of fine particulate air pollution (PM ) and contributes to climate change. Black carbon is formed by the incomplete combustion of fossil fuels, wood and other fuels**.
Complete combustion would turn all carbon in the fuel into carbon dioxide (CO ), **but combustion is never complete and CO , carbon monoxide, volatile organic compounds, and organic carbon and black carbon particles are all formed in the process. The complex mixture of particulate matter resulting from incomplete combustion is often referred to as soot.** Black carbon is a short-lived climate pollutant with a lifetime of only days to weeks after release in the atmosphere. During this short period of time, black carbon can have significant direct and indirect impacts on the climate, the cryosphere (snow and ice), agriculture and human health. Several studies have demonstrated that measures to prevent black carbon emissions can reduce near-term warming of the climate, increase
crop yields and prevent premature deaths.

**460-1,500x 4–12 days 6.6 million tonnes 51%**
**Black carbon has a warming impact on climate 460-1,500 times stronger than CO per unit of mass**
The average atmospheric lifetime of black carbon particles is 4-12 days About 6.6 million tonnes of black carbon were emitted in 2015 Household cooking and heating account for 51% of global black carbon emissions Black carbon emissions have been decreasing over the past decades in many developed countries due to stricter air quality regulations. By contrast, emissions are increasing rapidly in many developing countries where air quality is not regulated. As the result of open biomass burning and residential solid fuel combustion, Asia, Africa and Latin America contribute approximately 88% of global black carbon emissions. Black carbon is always co-emitted with other particles and gases, some of which have a cooling effect on the climate. The type and quantity

of co-pollutants differs according to the source. Sources that release a high ratio of warming to cooling pollutants represent the most promising targets for mitigation and achieving climate and health benefits in the near term.

CLIMATE IMPACTS

Black carbon is an important contributor to warming because it is very effective at absorbing light and heating its surroundings. Per unit of mass, black carbon has a warming impact on climate that is 460-1,500 times stronger than CO .

When suspended in the atmosphere, black carbon contributes to warming by converting incoming solar radiation to heat. It also influences cloud formation and impacts regional circulation and rainfall patterns. When deposited on ice and snow, black carbon and co-emitted particles reduce surface albedo (the ability to reflect sunlight) and heat the surface. The Arctic and glaciated regions such as the Himalayas are particularly vulnerable to melting as a result.

**HEALTH IMPACTS**

Black carbon and its co-pollutants are key components of fine particulate matter (PM2.5) air **pollution, the leading environmental cause of poor health and premature deaths**.

**At 2.5 micrometres or smaller in diameter, these particles are, many times smaller than a grain of table salt, which allows them to penetrate into the deepest regions of the lungs and facilitate the transport of toxic compounds into the bloodstream**. PM2.5 has been linked to a number of health impacts **including premature death in adults with heart and lung disease, strokes, heart attacks, chronic respiratory disease such as bronchitis, aggravated asthma and other cardio-respiratory symptoms. It is also responsible for premature deaths of children from acute lower respiratory infections such as pneumonia**. Each year, an estimated 7 million premature deaths are attributed to household and ambient (outdoor) PM2.5 air pollution.

**IMPACTS ON VEGETATION AND ECOSYSTEMS**

Black carbon can affect the health of ecosystems in several ways: **by depositing on plant leaves and increasing their temperature, dimming sunlight that reaches the earth, and modifying rainfall patterns**. Changing rain patterns can have far-reaching consequences for both ecosystems and human livelihoods, for example by disrupting monsoons, which are critical for agriculture in large parts of Asia and Africa**. Black carbon's short atmospheric lifetime, combined with its strong warming potential, means that targeted strategies to reduce emissions can provide climate and health benefits within a relatively short period of time.** The Coalition supports implementation of control measures that, if globally implemented by 2030, could reduce global black carbon emissions by as much as 80% (UNEP & WMO 2011). Several of these emission reductions could be achieved with net cost savings. Adopting these measures would have major positive co-benefits for public health, especially in the developing world.

## Nanoparticulate carbon black particles tiny culprits that start emphysema

When pathologists perform autopsies on smokers who died with severe emphysema, they find that lungs are black in appearance. **These emphysematous lungs place strain on lung structures and ultimately other organs.** Until recently, researchers and physicians could only guess at the composition of the material that gave the black color to the lungs of smokers.--In two seminal papers -- one in the online publication *eLife* and the journal *Nature Immunology* -- researchers led by Drs. David Corry and Farrah Kheradmand, both of Baylor College of Medicine, identify that **black material as mostly insoluble nanoparticulate carbon black, tiny specks that result from the incomplete combustion of organic material, such as tobacco**. **The particles average between 30 and 40 nanometers in size.--**Nanometers are indescribably small. **A human hair has a diameter of about 100,000 nanometers. A nanometer is many times smaller than a red blood cell, a bacterium, a virus and even smaller than a cell membrane**. **These nanoparticulates of carbon black are about half the width of the membrane that surrounds a cell.--**When Kheradmand, professor of medicine -- pulmonary at Baylor, and her colleagues, including Corry, studied the lungs of mice exposed to cigarette smoke and human smokers with emphysema, **they found that this black material accumulates in the dendritic cells of humans and in the antigen-presenting cells of mice**. (Dendritic cells are a type of human antigen-presenting cell.)-----She and Corry sent samples of the black material found in the cells to their major collaborator, Dr. James Tour, professor of chemistry, computer science, materials science and nanoengineering at the Rice University Smalley Institute for Nanoscale Science and Technology, **who identified the material as the nanoparticulate carbon black**. Ran You, a graduate student in Kheradmand's lab then **introduced pure nanoparticulate carbon black, roughly the amount found in the lungs of human smokers, directly into the noses of mice and found that it caused the animals to develop emphysema, proving the danger of this material.--**The finding is important because **the composition of the black matter was unknown in the past**. **Past researchers had theorized that it was tar, aluminum and other dark pigments**. While it seemed obvious that it would be a form of carbon, studies of **the temperatures of burning cigarettes show that they were 800 to 920 degree Centigrade (1472 degree Fahrenheit to 1688 degrees F)** during inhalation -- **high enough to create the nanoparticulate carbon black.--** Tour emphasizes that the finding is not limited to tobacco smoke. **Many products, such as tires, contain significant amounts of nanoparticulate carbon black**.---"I am concerned about how this affects industry," said Tour. "It is going to have to change." He said **workers could be affected when working in these industries that use carbon black, such as the rubber and plastics industry**. "As it gets into the air, **for example through tire-tread wear, it could affect the public as well**, and it is imperative that risk-assessments be conducted."

**While smaller carbon black, of about 15 nanometers, induced the most severe response**, increasing the size of the carbon black particulates to about 70 nanometers, or oxidizing the surface of the carbon black -- greatly reduced their toxicity, he said, based upon the data presented in the eLife paper.--Kheradmand and her graduate student Ms. Ran You found that **this form of carbon black caused double-stranded breaks in the cell's DNA, a state that is very difficult to repair**, **and activates T helper 17 cells, inducing chronic inflammation in the lungs.--**"We showed that it's dose dependent," she said. **"The more you have, the worse it is. It is also size dependent**. The bigger particles do much less damage."--"You never get rid of this stuff," said Corry, professor of medicine and chief of the division of immunology, allergy and rheumatology at Baylor. "It will be important to conduct further studies to fully assess the spectrum of health-risk profile."--In the *eLife* article, the authors wrote: **"These findings largely explain the persistent and incurable nature of smoking-related lung disease. Because no medical means of removing accumulated lung nCB (nanoparticulate carbon black) exists, our findings underscore the need for all individuals and societies to minimize the production of and exposure to smoke-related particulate air pollution and industrial nCB**."--In the article in *Nature Immunology*, Corry builds on the findings in *eLife*, studying the role of microRNA-22 (miR-22) as a link in the chain from exposure to the carbon black to development of emphysema.-"We used to think of these tiny pieces of genetic material as junk," said Corry. "**Now we know that they are off-switches for protein coding genes."--**Previous studies had found that the microRNA was present at increased levels in the dendritic cells in the lungs of smokers with emphysema. Corry and his colleagues also found them in the antigen-presenting cells of mice exposed to tobacco smoke or nanoparticulate carbon black.--Mice that lack this microRNA do not develop emphysema and have a reduced T helper 17 cell response. When Corry and first author Wen Lu, a graduate student in immunology, sought to determine how the microRNA worked, they found histone deacetylase 4, a protein that plays a role in the regulation of DNA transcription, cell cycle and development. **When microRNA-22 is missing, this protein increases. This histone deacetylase suppresses a protein called interleukin-6, which is key to the production of the T helper 17 cell response.--**"This could be a therapeutic finding," said Corry. "We could design drugs to inhibit the microRNA through inhalation."-**Story Source-**The above post is reprinted from materials provided by **Baylor College of Medicine**. ---**Journal References**-Wen Lu, Ran You, Xiaoyi Yuan, Tianshu Yang, Errol L G Samuel, Daniela C Marcano, William K A Sikkema, James M Tour, Antony Rodriguez, Farrah Kheradmand, David B Corry. **The microRNA miR-22 inhibits the histone deacetylase HDAC4 to promote TH17 cell–dependent emphysema**. *Nature Immunology*, 2015; DOI: 10.1038/ni.3292 ----Ran You, Wen Lu, Ming Shan, Jacob M Berlin, Errol LG Samuel, Daniela C Marcano, Zhengzong Sun, William KA Sikkema, Xiaoyi Yuan, Lizhen Song, Amanda Y Hendrix, James M Tour, David Corry, Farrah Kheradmand. **Nanoparticulate carbon black in cigarette smoke induces DNA cleavage and Th17-mediated emphysema**. *eLife*, 2015; 4 DOI: 10.7554/eLife.09623 --Baylor College of Medicine. "Nanoparticulate carbon black particles tiny culprits that start emphysema." ScienceDaily. ScienceDaily, 5 October 2015. <www.sciencedaily.com/releases/2015/10/151005120907.htm>.