Interview with Prof. Dr. Mohamed Abou-Donia,
Duke University Durham, North Carolina, USA
at London on 18.05.2011

Q: What are the major findings in regard to your recent study?

AD: We had a test, where we look for markers in the serum or the blood of the flight attendants and of the pilots, and we have markers for brain damage. So we looked for specific markers only to tell us that there is some problem with the brain.

Q: And what did you find?

AD: What we found in our samples is markers that actually indicate that there was cell death and prove for brain damage. That is what was very important to us, that we show that the illnesses that flight crews are complaining about is related to the damage to the cells and to the brain.

Q: Are there other effects of these pyrolized "cocktails"when inhaled?

AD: These chemicals what the pilots and the flight attendants were exposed to, this can cause all sorts of neurological damage. A major effect is on the brain, they also have other effects, like in the reproductive system and in the libido…it decreases the libido of the males, especially. It further causes problems with the heart, it causes heart disease, it causes differently brain problems. So, these chemicals are not safe at all.

Q: And what about passengers?

AD: There's no doubt that the passengers also get exposed and they get also sick, but the problem is, they may not associate their sickness and illnesses to what happened in the plane. And it is very common that after a long flight, that you don't feel well but you don't relate it to the inhaled oil fumes, you may relate it to an infection.

Q: What proof do you have in relation between contaminations and consequences?

AD: I believe that is, because there is a timeline, there is always right after exposure that the flight attendants and pilots complain. So there is this time association between exposure and the appearance of symptoms.

Q: We recently had a case were the crew complained about oil smell for 20 minutes after take off and 10 minutes prior to landing. What do you think about such a time span, inhaling oil fumes

AD: Twenty minutes is a very, very long time for exposure because it is not just one incident. In twenty minutes every time you take a breath, every time a person breathes, that's a dose, that's exposure. And inhalation is the most effective method of exposure, because inhalation is a very direct way of contamination. As soon as you inhale something, within seconds it metabolizes and that metabolite goes straight to the brain.

Q: There has been a lot of misdiagnosis of such persons with MS, Parkinson and other neurological diseases. Do you have an explanation for this?

AD: The medical schools usually teaches doctors or students who become doctors that diseases are related to the immune system, or to bacteria, or virus. And it's rarely that we teach our students that chemicals can cause diseases. And this is really critical, therefore the first point of order is to make the physicians aware of the problems that these chemicals do cause, when you get exposed to them.

Q: Why is there different effects on different people? For example, in a recent case the captain smelled something but his first officer not and he also did not show any effects where the Captain and other crewmembers later did.

AD: This is because people are different. The makeup of everybody is different to that of the other genetically and in regards to the enzymes. We all have the same organs, the same tissues, but we are different. Different in a way that we also have in our bodies some different mechanism of defence against organophosphates. And some people have less of this mechanism than others. So it is very possible that a pilot will become affected because he has lower defences than the co-pilot, who has a very high defensive mechanism.

Q: According to your findings: Are there groups particularly at risk?

AD: So far as we know, there is not a single group, but among the population, most of the people have usually have good mechanisms of defence, but there are some people, I would say about twenty percent, who have much less defence and less than one percent of the population have a zero tolerance to these chemicals. So it depends.

Q: Will this kind of exposure cause irreversible damage?

AD: The damage that we have seen, is usually caused by brain cell death and effects on the peripheral nervous system. This is irreversible. But also likely, if the damage is not too severe, some peripheral nerves do regenerate, so we'll have new nerves. But the brain cells that are not damaged could take over the function of the damaged brain cells and there could be improvement. So yes, there is a chance, depending on some factors and if somebody who was exposed for example will be exposed again, that these persons who have been only a little bit exposed to these chemicals can actually improve, if not recover.

Q: Why is there the industry's tremendous reluctance to epidemiological studies?

AD: I really don't know, to me it makes no sense. But usually, all of these things are related to cost and expenses, which is hard for me to understand, but I would love to see that industry testing these chemicals and do the studies to show how these chemicals work and how to prevent exposures to humans. - For everybody's interest!

Q: It is always said when it comes to measurements there has been *no TOCPs measured. Is this justified?*

AD: Well, the fact that there is no TOCP that does not really mean that there is no damage. Because the patients were not saying that the damage is related to only one chemical. It is related to the "cocktail" of chemicals. We know that could be more than ten thousand twenty chemicals that actually do cause the effect that we see.

Q: Would you voluntary inhale heated engine oil?

AD: Certainly not and I hope I wouldn't! I certainly would not do it intentionally. But if I am sitting in a plane and there is a smoke and you are breathing, then you have no choice. And you inhale it and you could get sick. And one thing is that a passenger would be sick, or a flight attendant. But you absolutely don't want the pilots to get sick...

Q: Pregnant women?

AD: Yeah. Many, many studies have shown that organophosphates cause effects on unborn foetus. If a woman is pregnant, then the next generation will be affected. Many studies have shown that these chemicals actually do affect the pregnancy condition and the pregnancy cycle and it's really important to realize that pregnant women have much lower defence mechanisms than non-pregnant women. So a pregnant woman is at risk, to start with, from exposure to these chemicals. And it follows: their foetus will also be at risk as well.

Q: Small children?

AD: Our brain is not actually mature until the age of twenty. So the first twenty years the brain is still developing. So obviously, younger children, infants and older children are the more affected by these chemicals than adults.

Q: What were the major findings in blood samples, you did recently analyze?

AD: We have in all of these cases, we did find that the persons who were exposed and that were complaining we found nervous system damage and brain damage. There is always a very noticeable increase in this marker, that we see in their blood and that reflects brain damage and brain cell death.

Q: Is this a concern for you?

AD: Well, it is, of course! We are hopeful that once we publish this data and we standardize the method for having this test, to testify chemical exposure or damage related to this form of chemical exposure, that this will actually encourage other agencies to use the test for diagnosis purposes.

Q: What is your message to pilots?

AD: I think it is really the duty of every person on the flight to report any fume incident. Whether it is a passenger, flight attendant or pilot. There might be some concern of some people, that this might affect their jobs or their ability to continue to work, but for everybody's sake we really have to start and need to document these incidents.

Q: Are the effects always immediate?

AD: We usually see the effect immediately and then it may continue for years to come. So it's very important to document it as soon as possible. Just to know the proximity, the timeline is very important to connect the incident, when it took place, and when the symptoms took place.

Q: For the research: what budgets are needed

AD: Unfortunately, research is very expensive. Especially when you use inhalation techniques and testing. There are very few experts who can do this work and it requires a lot of money.

Q: Are we talking millions or billions?

AD: I think we are talking about very close to a million dollar.

Q: And then it could be done?

AD: Well, in the big picture, it is nothing. I mean how much are the governments spending on health issues? So a million or two millions is almost a fraction. Let's talk about cancer research for example: we spend millions and millions of dollar every year, which is very important to do! But chemical exposure is also important. There are thousands of people who are affected every day and we keep saying that we don't know. Why we don't know? We are actually able to know and we can do it. We can actually do the study, do the experiments, and can differentiate what could actually kill us, that this is or that isn't the effect. And that's very important.