Reviewer's report

**Title:** Heated indoor swimming pools, infants, and the pathogenesis of adolescent idiopathic scoliosis A neurogenic hypothesis involving delayed epigenetic effects of neurotoxins during development of the central nervous system.

**Version:** 1 **Date:** 4 July 2011

**Reviewer:** Alain Moreau

**Reviewer's report:**

Major Compulsory Revisions

This is a very well written paper addressing the potential importance of neurotoxic chemicals present in indoor swimming pool environment and understanding how they could affect the developing CNS. It is proposed that exposure to such neurotoxic compounds could be associated with adolescent idiopathic scoliosis (AIS).

My overall impression is that there is given a very good argument for why these toxins and their effects should be investigated. The mention of prior studies for which scoliosis are 3 times more prevalent among babies exposed to heated pools remains to be further documented and needs to be confirmed through adequate epidemiological studies. Indeed, the paper falls short of making the hypothesis feasible because it does not address how it could explain the high prevalence of IS (i.e. among individuals who do not swim in heated pools), the global prevalence of IS (i.e. in countries without heated pools even), or the heritability of IS (although it is mentioned, it is not discussed in the context of the hypothesis). The paper would benefit from a statement about the complexity of IS and explanations about why the clinical manifestations of AIS occurs several years later after exposure?

Secondly, it remains unclear what the author means by ...spinous process asymmetry... (see background section, 1st paragraph). This sentence is very confusing. I am not sure why it is mentioned. Spinous process asymmetry is (scoliosis is defined but not this) quite common. The fact that spinous process asymmetry is not mentioned again in the paper makes the sentence more confusing. What is the point? It is clear that spinous process asymmetry should not be associated automatically with scoliosis. How many individuals really developed scoliosis (with a Cobb angle of at least 10° after skeletal maturity)? These clinical data must be provided and all references about spinous process asymmetry removed since this is not a language shared by the majority of researchers and clinicians in this field.

Third and more importantly, if exposure to those neurotoxic compounds predispose or exacerbate pre-existing conditions leading to AIS, it would be easy
to test the author's hypothesis through classical epidemiological study. In that case, such exposure should be associated with a higher prevalence of severe scoliosis or higher incidence of juvenile scoliosis when compared to scoliotic patients that haven’t experimented heated indoor swimming pools in their first 12-months of life. This latter point was no possible to verify since juvenile scoliosis patients were excluded!!!

Minor issues (spelling, typographic and grammatical errors, etc.)

Presentation of the hypothesis section
1st paragraph, last sentence: a dot is missing after gases.

3rd paragraph, it would be important to provide the references regarding those data. None are provided!

Entry of neurotoxic substances to infant section
4th paragraph, there is a repeat that should be removed: During the first 6-months of life, CSF contains higher concentrations of proteins that are immunologically identical to proteins in plasma.

Which part(s) of infant’s CNS might be affected by neurotoxic substances, leading to AIS section
1st paragraph, last sentence: eliminate the extra dot after patients.

Neurotoxic substances produced in swimming pools section
1st paragraph, please provide the reference regarding the concentrations of chloroform and cyanogens in pool heated pool atmosphere?

Entry of neurotoxic substances…. Section
1st paragraph, there is a missing dot between the subsection title and the first sentence.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

No competing interests.