Author's response to reviews

Title: Secondhand smoke exposure toxicity accelerates age-related cardiac disease in old hamsters

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Author's response to reviews: see over
Dear Editor:

The manuscript title is “Secondhand smoke exposure toxicity accelerates age-related cardiac disease in old hamsters”.

Aging change of cardiac is associated with physiological or pathological left ventricular hypertrophy (LVH), normal or environment aging change. Secondhand smoke (SHS) exposure is associated with pathological LVH. The mechanism of action occurred concentric hypertrophy on SHS exposure process, but the transition of aged SHS exposure contributed LVH is not fully understood. To determine SHS exposure effect on age-induced concentric and eccentric LVH, we examined young and old hamsters underwent SHS exposure in chamber 30 mins, and then detected morphological and histological analysis using hematoxylin & eosin and masson’s trichrome staining, and echocardiographic analysis to determine left ventricular wall thickness and function. On the other hand, molecular level of LVH related proteins were detected by western blotting. Results showed that the young SHS exposure, aging and aged SHS exposure hamsters were increased heart weights and left ventricular weights, left ventricular posterior wall thickness and intraventricular septum at systolic and diastolic increased, but deteriorated left ventricular function at systolic and diastolic. Papillary muscles were ruptured and cardiac function was lower at the myocardial level. LV muscle fiber arrangement was disorder and collagen accumulation occurred. Molecular markers of concentric LVH related proteins were increased only in young SHS exposure, but declined with age and aged SHS exposure. By contrast, at eccentric LVH related proteins were increased in aging and aged SHS exposure. Pro-inflammatory proteins, IL-6, TNF-α, JAK1, STAT3, and SIRTI expression were increased in aging and aged SHS exposure hamsters. We suggest that SHS exposure leads pro-inflammatory response enhanced resulting in the transition of concentric to aging eccentric LVH.

The content of the manuscript is original and it has not been published or accepted for publication, either in whole or in part, in any form. No part of the manuscript is currently under consideration for publication elsewhere.

Sincerely yours,

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a point-by-point description of the changes made

(1) Title Page

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(2) Abstract

Abstract
Background: Aging is associated with physiological or pathological left ventricular hypertrophy (LVH) cardiac changes. Secondhand smoke (SHS) exposure is associated with pathological LVH. The action mechanism in cardiac concentric hypertrophy from SHS exposure is understood, but the transition contributed from SHS exposure is not. To determine whether exposure to SHS has an impact on age-induced LVH we examined young and old hamsters that underwent SHS exposure in a chamber for 30 mins.
Methods: Morphological and histological studies were then conducted using hematoxylin and eosin (H&E) and Masson’s trichrome staining.
Echocardiographic analysis was used to determine left ventricular wall thickness and function. LVH related protein expression levels were detected by western blot analysis. **Results:** The results showed that both young and aged hamsters exposed to SHS exhibited increased heart weights and left ventricular weights, left ventricular posterior wall thickness and intraventricular septum systolic and diastolic pressure also increased. However, left ventricular function systolic and diastolic pressure deteriorated. H&E and Masson’s trichrome staining results showed LV papillary muscles were ruptured, resulting in lower cardiac function at the myocardial level. LV muscle fiber arrangement was disordered and collagen accumulation occurred. Concentric LVH related protein molecular markers increased only in young hamsters exposed to SHS. However, this declined with hamster age. By contrast, eccentric LVH related proteins increased in aging hamsters exposed the SHS. Pro-inflammatory proteins, IL-6, TNF-α, JAK1, STAT3, and SIRT1 expression increased in aging hamsters exposed to SHS. **Conclusions:** We suggest that SHS exposure induces a pro-inflammatory response that results in concentric transition to aging eccentric LVH.