Response to Comment on “Silicone Wristbands as Personal Passive Samplers”

Mazzuco and Zuckerman’s comment to the paper, “Silicone Wristbands as Personal Passive Samplers” raises several interesting points, the foremost being that human silicone explants (implants that have been removed from the body) may be a novel way to examine chemical toxicants in a manner similar to silicone wristbands deployed as personal monitors. While they cite previous research showing the potential of in vivo absorption of organic toxicants by silicone from surrounding tissue, the authors make several points that require further clarification concerning both the retention of chemicals by silicone in the body and potential health issues from silicone implants.

Several questions in the comment concern chemical absorption into silicone within the body and possible implications. Namely, that implant rupture could release sequestered compounds back into the surrounding tissue as a single concentrated dose and pose an unknown health risk. However, this scenario is not realistic given the chemical principles of the uptake process. Absorbed chemicals in silicone implants (shell or gel) are either in equilibrium with the body tissue, or in nonequilibrium while the implant is passively sequestering chemicals from the surrounding tissue. Passive uptake of any individual compound is the result of both inherent compound properties in addition to physical characteristics of the surrounding environment. Therefore, some compounds may be more or less likely to be absorbed into silicone within living tissue. This diffusion process will move affected compounds from the tissue into the silicone over time, and slow down as equilibrium is reached. The overall likelihood of movement (i.e., fugacity) will not reverse and suddenly release the bulk of compounds back into the surrounding body tissue from which the compounds were originally sequestered. Recently we have analyzed breast explants and tested silicone in vivo sequestration in murine models, and our results further substantiate these points (to be submitted).

In addition to chemical uptake into silicone, the comment also mentions numerous health problems with breast implants and gives the example of a very rare form of cancer for which there is limited evidence of an association. It would be more accurate to note that there have been anecdotal claims of adverse health outcomes focused primarily on connective tissue diseases. More than 2 dozen epidemiological studies have reported a 30−50% reduction in risk seen when compared to women with no implant history or to the general female population. These studies, coupled with the results presented by O’Connell et al., give support to the possibility that silicone implants may act to reduce health risks through sequestration of organic toxicants from surrounding breast tissue.

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■ REFERENCES
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