Breast Cancer UK comments on the proposal to identify bisphenol A as a substance of very high concern (SVHC) meeting the criteria of Article 57 (f) of Regulation (EC) No 1907/2006 (REACH), for effects in relation to human health exerted through an endocrine disrupting mode of action

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Comments on the identity of the substance (Part I, section 1 of the Annex XV SVHC report) and on the proposed SVHC property / properties (Part I, sections 3-6)

Breast Cancer UK is a charity which aims to prevent breast cancer by reducing public exposure to carcinogenic and other hazardous chemicals in the environment. We are especially concerned about the potential role of exposures to environmental chemicals such as bisphenol A (BPA) in increasing breast cancer risk. We appreciate the opportunity to comment on the proposal to identify BPA as a substance of very high concern (SVHC), in relation to its endocrine disrupting mode of action.

Breast Cancer UK welcomes the comprehensive and well researched dossier prepared by France which presents strong and convincing evidence that BPA should be listed as a SVHC due to its endocrine disrupting properties. We fully support this proposal.

The dossier is based on literature searches up to May 2016. Since that time, there has been numerous articles which provide further evidence that low dose exposure to BPA is endocrine disrupting and detrimental to human health. We agree there is sufficient evidence for effects on reproductive function, alteration of mammary gland development, alteration of brain development and cognitive function, and alterations in metabolic function. Increasing evidence suggests that BPA may also affect the immune system (e.g.[1],[2],[3]).

Strong and convincing evidence presented in the dossier demonstrates BPA affects oestrogen signaling pathways, as a result of binding to ERα, GPR30 and ERRγ receptors, and prevents ligand binding to ERβ and androgen receptors. The dossier also suggests BPA may activate other receptors and pathways, although binding has not been established. We concur with this view; there is increasing evidence that BPA affects several endocrine pathways through oestrogen signaling, and possibly through direct binding to other nuclear receptors, such as progesterone[4] and glucocorticoid receptors[5]. The endocrine system is associated with a series of pathways, which often interact with one another. It is highly likely endocrine disrupting chemicals will affect multiple pathways, resulting in a range of health effects.

We at Breast Cancer UK are especially concerned that early exposures to BPA may induce or predispose humans to an increased risk of breast cancer, as well as other cancers[6]. The dossier highlights potential effects caused by BPA through nuclear receptor signaling and

epigenetic changes to oestrogen-dependent genes, and genes involved in embryogenesis and post-natal development. Recent studies highlight further the role of BPA in inducing epigenetic alterations (e.g.[7], [8]). These, along with the effects of BPA on oestrogen receptors (and other nuclear receptors) may affect mammary gland development which could increase susceptibility to breast cancer later in life.

In summary Breast Cancer UK support the dossier's conclusion BPA can affect a number of physiological functions and systems in mammalian organisms through an endocrine disruptive pathway, and can alter reproductive function, mammary gland development, cognitive function and metabolism through an endocrine mode of action and so should be classified as a SVHC due to its ED properties.

Specific comments on Part II 'Information on Use, Exposure, Alternatives and Risks':

BPA is widespread in the environment and is routinely found in freshwater, seawater and landfill leachates. It has been detected in human urine, blood, amniotic fluid, breast milk, fat tissue and the placenta[9]. Urinary BPA has been detected in people from many different countries, with most studies showing over 90% of individuals tested have BPA in their urine (e.g.[10], [11]) and several reporting higher levels in children compared to adults.

We at Breast Cancer UK are concerned that compounds used as substitutes for BPA may have similar endocrine disrupting properties. Bisphenols, such as bisphenol S (BPS), bisphenol F (BPF) and Bisphenol AF (BPAF) are used in the production of polycarbonate plastics and epoxy resins. Alternative bisphenols have been detected in human urine[12] and a recent study suggests BPF, BPAF, BPS, BPB and BPZ are all oestrogenic[13].

Dr Margaret Wexler
Science policy officer, Breast Cancer UK
margaret.wexler@breastcanceruk.org.uk
http://www.breastcanceruk.org.uk/
Reg. Charity No: 1138866 | Reg. Company No. 7348408

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