

BCUK Fact Sheet | Parabens

What are Parabens?

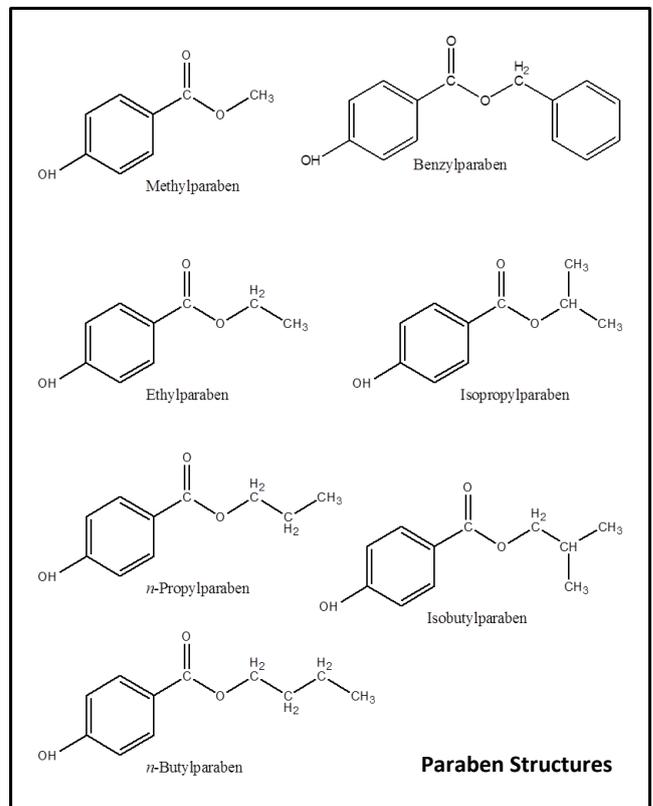
Parabens are alkyl esters (or more simply derivatives) of the chemical compound, para-hydroxybenzoic acid. The five most commonly used parabens in consumer products are methylparaben, ethylparaben, *n*-propylparaben, *n*-butylparaben and isobutylparaben. Isopropylparaben and benzylparaben are used less frequently.

Where are they found?

Parabens have been used as preservatives for many years in an extensive range of consumer products. They are used for their bactericidal and fungicidal properties and can be found in personal care products such as cosmetics, shampoos and body lotions and also in foods and pharmaceuticals (1-3). More recently, their use has been extended into preservation of paper products including sanitary wipes (4).

Why should we be concerned?

Due to their widespread use in consumer products, they have become measureable across the global ecosystem in recent years including in surface waters, sediment, soil and tissues of aquatic organisms (reviewed in 5). They are now measureable in house dust and indoor air (6-8). They have been measured in a range of human tissues. Most studies of human urine have found parabens in differing levels in almost all samples (reviewed in 9). Some studies show that greater



use of personal care products correlates with higher levels of parabens in the urine (10,11).

All the commonly used parabens possess the ability to mimic the action of the female hormone oestrogen (reviewed in 12). They are therefore, endocrine disrupting chemicals, which if they get into the human body have the potential to impact on the health of both women and men.

All parabens have been shown to bind to human oestrogen receptors and increase expression of oestrogen-responsive genes in human cells. For human cells which rely on oestrogen for their growth, parabens will also increase the growth of the cells (reviewed in 9,12)

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How are parabens linked to breast cancer?

Lifetime exposure to oestrogen is an established risk factor for breast cancer (13). Epidemiological, experimental and clinical studies carried out over the past century provide evidence that oestrogen can increase development of breast cancer (13). The reduction of breast tumour growth in endocrine therapy by antagonism of oestrogen action (i.e. via drugs such as tamoxifen or fulvestrant) or inhibition of oestrogen synthesis (via drugs such as aromatase inhibitors) (14) demonstrates the central role of oestrogen in breast cancer. Parabens can mimic oestrogen action (reviewed in 9,12) and have been measured in human breast tissue (15,16) at concentrations which are functionally capable of mimicking oestrogen action in a way which could lead to increased growth of oestrogen-responsive human breast cancer cells (17).

Links to other diseases

As well as breast cancer, exposure to parabens is of concern in relation to disruption of other reproductive functions. Exposure to high levels of oestrogen before or just after birth can be detrimental for male reproductive function leading to testicular dysgenesis syndrome with future implications for fertility (12). Concern has also been expressed about the potential links between use of parabens in sun care products and skin cancers (12).



Parabens are used widely in products, including in cosmetics

Although defined as relatively non-irritating, a number of studies have reported that parabens in cosmetics could induce allergic contact dermatitis and skin inflammation in paraben-sensitive individuals (18).

What is the current regulatory position on parabens?

Parabens have been and remain under regulatory review for their use in both food and cosmetics. As it stands, regulatory review has centred around adverse effects on male reproductive endpoints and not on any adverse impact on the female breast. In 2004, the European Commission Scientific Panel on Food Additives, Flavourings, Processing Aids and Materials in Contact with Food of the European Food Safety Authority (EFSA) were unable to establish a no-observed-adverse-effect-level for propylparaben on the grounds of endocrine toxicity. In other words they were unable to set a level at which the chemical could be found to have no effect (19).

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In 2007, the Joint Food and Agriculture Organization (FAO) and World Health Organization (WHO) Expert Committee on Food Additives recommended the withdrawal of an acceptable daily intake (ADI) level for propylparaben and butylparaben on the grounds of reproductive and endocrine toxicity (20).

Within the European Union, ingredients used in cosmetics are subject to **recommendation** rather than **regulation** under the European Union Cosmetics Directive (EU Cosmetics Directive 76/768/EEC). Under this Directive, parabens have been recommended for use in cosmetic products with a maximum concentration of each one of 0.4% and a total maximum concentration of 0.8% (EU Cosmetics Directive 76/768/EEC). However, more recent review has recommended reduction in the levels of *n*-propylparaben and *n*-butylparaben in cosmetic products to a combined maximum concentration of 0.19% with recommendation still pending for isopropylparaben, isobutylparaben and benzylparaben (21).

On 21 March 2011, Denmark notified the Commission that it had banned propylparaben, butylparaben, their isoforms and salts in cosmetics for children under the age of three years on the grounds of reproductive toxicity. This prompted further review by the EU (22) who confirmed concern for use of parabens in leave-on products especially in the nappy area and a public consultation by the EU remains open at the current time.

Breast Cancer UK position:

- Breast Cancer UK supports the phase out of all parabens from all cosmetics and products designed to be applied to the skin.
- Breast Cancer UK supports an extension of EU Article 60 (3) of the REACH Regulation, to ensure EDCs (including parabens) are, by default, classed as Substances of Very High Concern (SVHC), for which no safe thresholds can be determined (23).
- Breast Cancer UK supports the inclusion of such chemicals to the REACH list of most harmful chemicals (Article 57 on SVHC), and support bans of these chemicals where safer alternatives and no predominant socio-economic need exists (Article 60.3).

We would like to thank Dr Philippa Darbre, Associate Professor at the School of Biological Sciences, University of Reading, for her input and assistance in putting together this fact sheet.

Further Resources:

[Further publications by Dr Philippa Darbre](#)

[European Commission, Scientific Committee Updated Opinion on Parabens](#)

[World Health Report; Evaluation of certain food additives and contaminants](#)

[Campaign for Safe Cosmetics \(USA\)](#)

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- For more info see also 'CHEM Trust's position paper on the REACH review of the authorization of Endocrine Disrupting Chemicals' (2013): <http://www.chemtrust.org.uk/wp-content/uploads/CHEM-Trust-Briefing-on-REACH-EDC-review-FINAL.pdf>

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