COMMITTEE ON CARCINOGENICITY OF CHEMICALS IN FOOD, CONSUMER PRODUCTS AND THE ENVIRONMENT

Second Draft Introduction to COC guidance statement series

Enclosed in Annex A is the second draft of the introduction to the COC guidance statement series, incorporating the changes suggested at the March 2017 meeting.

Members are invited to comment on the structure and contents of the draft.

Imperial College Toxicology Unit/Secretariat
July 2017

CC/2017/11 Annex A

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Second Draft Introduction to COC guidance statement series

Second draft document

Imperial College Toxicology Unit/Secretariat
July 2017

Introduction to the COC guidance statement series

The Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) is an independent UK advisory committee reporting to the Department of Health and the Food Standards Agency (FSA). The terms of reference for the COC include providing general advice to government departments and regulatory agencies on whether chemicals may cause cancer in humans, and related, relevant topics. This includes methods of testing, research, and assessing the risk posed by chemicals that may cause cancer (risk assessment).

The COC has periodically published guidelines on how to assess the extent to which chemicals may be likely to cause cancer (carcinogenicity) and how they do so. These included guidance on best practice for testing chemicals to see if they are likely to cause cancer (i.e. whether they are carcinogenic) and how likely they are to do so (their potency) (COC, 1982; COC, 1991; COC, 2004). The guidance documents are intended to be of use to Government Departments and Agencies, Committee members, and other persons with a reasonable level of knowledge or interest in this field.

This most recent revision of guidance began in 2010 and will be a rolling update programme. The key topics that underpin this work are separated into ten distinct but interrelated Guidance Statements, which will be updated as important new information becomes available. These statements give the Committee's views on the general principles and emerging scientific discoveries, experimental methods, and analysis relevant to carcinogenic hazard and risk assessment.

One key aspect to have clear in considering the Committee's guidance is the difference between hazard and risk. The term 'hazard' refers to whether or not a substance or activity is capable of causing cancer, while 'risk' is the likelihood that exposure to the substance or activity will actually lead to the development of a cancer (i.e. the chance of illness occurring). When a substance or activity is identified as being a carcinogenic hazard, the level of cancer risk will depend on how people have been exposed, for how long, to how much, and the carcinogenic potency of the substance to which they have been exposed.

The available Guidance Statements are as follows:

G 01: A strategy for the risk assessment of chemical carcinogens (published 30 June 2012)

This overarching statement presents the Committee's recommended general approach to assessing to what extent a chemical can cause cancer, drawing together the other statements.

G 02: Interpretation of Evidence of Carcinogenicity in Humans: Epidemiology and Case Reports (in preparation)

This Statement will provide guidance on how studies of health effects in human populations (human epidemiological studies) can be used to help to assess the extent to which a chemical causes cancer.

G 03: Hazard identification and characterisation: conduct and interpretation of animal carcinogenicity studies (published 2 February 2015)

To date, the potential for substances to cause cancer in humans has been identified in the main through laboratory studies using animals. The most common approach has involved exposing laboratory mice or rats to a test substance for 2 years (known as the '2-year bioassay'). This Guidance Statement discusses the setup of such animal studies and how the data obtained can be used to identify and characterise substances that may cause cancer, including the relevance of this information to the likelihood of carcinogenicity in humans.

G 04: The use of biomarkers in carcinogenic risk assessment (published 1 July 2013)

Substances, structures, or processes that indicate the presence of cancer, and can be measured in the body, are termed 'biomarkers' (biological markers). This Guidance Statement discusses how biomarkers are used in different parts of the carcinogenic hazard and risk assessment process.

G 05: Defining a point of departure and potency estimates in carcinogenic dose response (published 29 September 2014)

In order to estimate how likely it is that a person will develop cancer or how many people in a given population are likely to develop cancer from exposure to a particular substance, it is necessary to investigate the 'dose-response relationship' between that substance and the cancer that it causes – i.e. how the amount and duration of exposure to the substance (the dose) affects the nature and extent of cancer seen in those exposed (the response). Guidance Statement G 05 gives advice on how to use the various methods that are needed to evaluate the relationship, and estimate the potency of the substance.

G 06: Risk characterisation methods (published 30 June 2012)

Studies of chemicals in laboratory animals (as discussed in G 03) usually employ higher doses of substances than those to which humans would normally be exposed. In addition, the response of animals can be different to that of humans. Both of these mean that there are uncertainties in estimating the effects in humans (i.e. characterising the risk) from the animal data. Guidance Statement G 06 gives the views of the Committee on how to estimate the level of risk to humans from exposure, usually at low levels, to different types of carcinogens.

G 07: Alternatives to the 2-year bioassay (parts a, b published 2 February 2016; parts c, d in preparation)

Steps are being taken to replace, where possible, the 2-year rodent bioassay (see Guidance Statement, G 03) with alternatives that more accurately predict substances that cause cancer in humans, that reduce, refine and replace the use of laboratory animals in line with the '3Rs' principle and that are more cost-effective. This Guidance Statement, in four parts, provides an overview of approaches that have been proposed as alternatives, including some of the different types of animal and non-animal tests that may be used, and how it has been suggested these might be incorporated into an overall testing strategy.

G 08: Statement on the risk assessment of the effects of combined exposures to chemical carcinogens (published 1 July 2010)

People are exposed to a mixture of many different substances on a daily basis, not just one in isolation. It is not possible for the risk assessment process to account for the combined action of all the potential exposures to mixtures of carcinogens that theoretically could occur. However, the Committee has identified some general principles that may be considered when assessing the risk of cancer from a combination of different substances. This is discussed in Guidance Statement G 08.

G 09: Assessing the risks of less than lifetime exposure to carcinogens (in preparation)

People do not always experience lifetime exposure to a cancer causing substance or activity, instead exposure may occur only once or for limited periods of time. This Guidance Statement will discuss approaches to assess how the risk of cancer would be expected to vary when a person is exposed for a period of time that is less than a complete lifetime.

G 10: Joint statement on nanomaterial technology (published 1 December 2005)

Nanomaterials are defined as having at least one dimension with a size of less than 100 nm. They are increasingly present in the environment to which humans are exposed. Guidance Statement G 10 is a position statement from the three advisory Committees, the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT), the Committee on Mutagenicity of Chemicals in Food, Consumer Products and the Environment (COM) and the COC on nanomaterials. The Joint Statement considers risk assessment and a suggested initial strategy for toxicology testing.

COC
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References:

COC (1982) Guidelines for the Testing of Chemicals for Carcinogenicity. Report on Health and Social Subjects no. 25. London.

COC (1991) Guidelines for the evaluation of chemicals for carcinogenicity. Report on Health and Social Subjects no. 42. Department of Health, London.

COC (2004) Guidance on a strategy for the risk assessment of chemical carcinogens. Department of Health, London, UK.