

PREGNANCY IN THE LAB

A guide to reproductive toxic chemical, biological, and radiological hazards

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This list was compiled with the collaboration of several members of staff working at the IoN. It aims to cover most toxic hazards an expectant member of staff can encounter in our lab spaces.

Please note that **this is not an exhaustive list**. If you are aware of any other hazardous elements that should be included in this list, please contact the IoN Labs Operations Manager (Stephanie Czieso: s.czieso@ucl.ac.uk) or the IoN HR Manager (Laura Allum: l.allum@ucl.ac.uk).

1. CHEMICAL HAZARDS:

a) **Broad categories of chemicals that may induce adverse effects during pregnancy:**

- Alkylating agents
- Anaesthetic gases
- Arsenic
- Benzene
- Carbon monoxide
- Chlorinated hydrocarbons
- Diethylstilbestrol
- Dimethyl sulfoxide
- Dioxin
- Fungicide
- Heavy metals (lead, cadmium etc.)
- Organic mercury compounds
- Organophosphate
- Pesticides
- Polychlorinated biphenyls

b) **Examples of chemicals that may induce adverse effects during pregnancy [1].**

- 1,2,3-Trichloropropane
- 1-Bromopropane
- 2,3-Epoxy-1-propanol
- 2-Bromopropane
- 2-Ethoxyethanol
- 2-Ethoxyethyl acetate
- 2-Hexanone

2-Methoxyethanol
3-Amino-1,2,4-triazole
Acrylamide
Allyl glycidyl ether
Benomyl
Borates tetrasodium salts
Boron oxide
Cadmium
Carbon disulphide
Carbon monoxide
Chloroform
Cyclohexylamine
Di(2-ethylhexyl)phthalate
Dimethylformamide
Di-n-butyl phthalate
Dinitrotoluene
Ethyl acetate
Formamide
Hexane 110-54-3
Lead arsenate
Lead chromate
Mefepristone/RU-486
Methyl isocyanate
N,N-Dimethyl acetamide
Nickel carbonyl
Nitrobenzene
Nitrotoluene
Organic/inorganic forms of mercury
Phenylethylene
Piperazine dihydrochloride
Toluene
Vanadium pentoxide

Managers and pregnant worker should ensure the safety sheets are read for every chemical that is to be used. Risk assessments are in place for chemicals and stipulate what precautions must be taken.

All chemicals with the following Risk Phrases / Hazardous Phrases must be avoided while pregnant:

- R40: limited evidence of a carcinogenic effect.
- R45: may cause cancer.
- R46: may cause heritable genetic damage
- R49: may cause cancer by inhalation
- R60: may impair fertility
- R61: may cause harm to the unborn child
- R62: possible risk of impaired fertility
- R63: possible risk of harm to the unborn child
- R64: may cause harm to breastfed babies
- R68: possible risk to irreversible effects

- H360: May damage fertility or the unborn child
- H361: Suspected of damaging fertility or the unborn child
- H361d: Suspected of damaging the unborn child
- H362: May cause harm to breast-fed children

2. BIOLOGICAL HAZARDS:

Work with biological agents is covered by the Control of Substances Hazardous to Health Regulations 2002 and general advice on control measures can be found in the COSHH Approved Code of Practice.

Biological agents are classified according to the risks to human health, animals, plants and the environment. COSHH classifies human pathogens into four hazard groups.

The four hazard groups of human pathogens and the basis of their classification are as follows.

- ✓ Hazard group 1 (HG 1): Biological agent that is unlikely to cause human disease.
- ✓ Hazard group 2 (HG 2): Biological agent that can cause human disease and may be a hazard to employees but is unlikely to spread to the community and there is usually effective prophylaxis or treatment available.
- ✓ Hazard group 3 (HG 3): Biological agent that can cause severe human disease and may be a serious hazard to employees and it may spread to the community but there is usually effective prophylaxis or treatment available.
- ✓ Hazard group 4 (HG 4): Biological agent that causes severe human disease and is a serious hazard to employees and it is likely to spread to the community and there is usually no effective prophylaxis or treatment available.

Any biological agent belonging to the hazard groups 2,3 and 4 should be handled with care. Many biological agents can affect the unborn child if the mother is affected during pregnancy.

Some biological agents known to pose risk to expectant mother include:

- Chicken pox
- Coccidiomycosis
- Cytomegalovirus
- Ebola virus
- Hepatitis B virus
- Hepatitis C virus
- Hepatitis E virus
- Herpes
- Human Immunodeficiency Virus
- Listeria
- Malaria
- Measles
- Parvovirus B19
- Rubella
- Toxoplasma gondii
- Zika virus

3. RADIOLOGICAL HAZARDS

See reference [2].

4. ADDITIONAL GUIDANCE TO SAFELY WORK IN WET LABS:

Pregnant/breastfeeding women should avoid:

- Work with any tissue fixative solution
- Handle tissues that have been fixed
- Be present during cutting of formalin-fixed samples
- Enter rooms where formalin is stored
- Mount immunohistochemistry slides using DPX solution
- Handle samples with reducing agents such as β -Mercaptoethanol. Once samples are loaded in western gel then it is safer to handle.

Consider if there are reagents you might use instead of those listed above:

- Consider using a safer alternative reducing agent: e.g. DTT instead of β -Mercaptoethanol.
- Consider using alternative transfer buffer without methanol or substituting methanol for ethanol.
- Be aware of possible increased sensitivity to odours of β -Mercaptoethanol and TEMED that may result in nausea. Avoid areas where others are using these reagents.

Please let us know if there are any additional considerations that should be mentioned in this document. You can contact the IoN Labs Operations Manager (Stephanie Czieso: s.czieso@ucl.ac.uk) or the IoN HR Manager (Laura Allum: l.allum@ucl.ac.uk).

References:

1. Rim K-T (2017) Reproductive Toxic Chemicals at Work and Efforts to Protect Workers' Health: A Literature Review. *Safety and Health at Work* 8: 143-150.
2. Working safely with ionising radiation - Guidelines for expectant or breastfeeding mothers. Health and Safety Executive. <https://www.hse.gov.uk/pubns/indg334.pdf>