Anne Marie Vinggaard - Projects - DTU Orbit (31/03/2019)

**Improved human risk assessment of polyfluoroalkyl substances**

Davidsen, N., PhD Student, National Food Institute
Vinggaard, A. M., Main Supervisor
Rosenmai, A. K., Supervisor
Svingen, T., Supervisor
01/03/2019 → 28/02/2022
Project: PhD

**CeHoS: Center for Hormonforstyrrende Stoffer (Centre for Endocrine Disruptors)**

Svingen, T., PI, National Food Institute, Research group for Molecular and Reproductive Toxicology
Vinggaard, A. M., PI, Research group for Molecular and Reproductive Toxicology, Copenhagen Center for Health Technology, National Food Institute
Nature of activity type: Research, Individual grant
Collaborators: University of Southern Denmark, Righospitalet, Miljøstyrelsen
Project: Research › Research, Individual grant

**ThyroMix: Development of tool for mixture risk assessment of thyroid hormone disrupting chemicals**

Grant from the Ministry of Environment and Food of Denmark
Vinggaard, A. M., PI, National Food Institute, Research group for Molecular and Reproductive Toxicology, Copenhagen Center for Health Technology
Johansson, H. K. L., Project Participant, Research group for Molecular and Reproductive Toxicology, National Food Institute
Boberg, J., Project Participant, Research group for Molecular and Reproductive Toxicology, National Food Institute
Petersen, M. A., Project Participant, Research group for Molecular and Reproductive Toxicology, National Food Institute
01/10/2016 → 31/01/2018
Nature of activity type: Individual grant
Project: Research › Individual grant

**JANUS: Prediction of male reproductive health effects by integrating in vitro data and PBK modelling**

Vinggaard, A. M., PI, National Food Institute, Research group for Molecular and Reproductive Toxicology, Copenhagen Center for Health Technology
Christiansen, S., Project Participant, Research group for Molecular and Reproductive Toxicology, National Food Institute
Frandsen, H. L., Project Participant, Research group for Analytical Food Chemistry, National Food Institute
Svingen, T., Project Participant, Research group for Molecular and Reproductive Toxicology, National Food Institute
01/10/2017 → 30/09/2020
Nature of activity type: Individual grant
Collaborators: Brunel University
Project: Research › Individual grant

**HBM4EU: H2020 European Joint Program: Human Biomonitoring for Europe**

Vinggaard, A. M., PI, Research group for Molecular and Reproductive Toxicology, National Food Institute
Taxvig, C., Project Participant, Research group for Molecular and Reproductive Toxicology, National Food Institute
Rosenmai, A. K., Project Participant, Research group for Molecular and Reproductive Toxicology, National Food Institute
Boberg, J., Project Participant, Research group for Molecular and Reproductive Toxicology, National Food Institute
Johansson, H. K. L., Project Participant, Research group for Molecular and Reproductive Toxicology, National Food Institute
Svingen, T., Project Participant, Research group for Molecular and Reproductive Toxicology, National Food Institute
01/01/2017 → 31/12/2021
Nature of activity type: Individual grant
Collaborators: >100 European partners
Project: Research › Individual grant

**Towards improved human reproductive health: gaining new insight into chemically induced effects on male reproduction**

Grant from the Danish Research Council, 2017-2019
Vinggaard, A. M., PI, Research group for Molecular and Reproductive Toxicology, National Food Institute
Svingen, T., Project Participant, Research group for Molecular and Reproductive Toxicology, National Food Institute
Schwartz, C. V. L., PhD Student, Research group for Molecular and Reproductive Toxicology, National Food Institute
01/01/2017 → 31/12/2019
Nature of activity type: Individual grant
Future risk assessment of chemicals (MiraculiX)
Development of Physiologically Based Kinetic (PBK) models for risk assessment of chemicals.
Vinggaard, A. M., Project Coordinator, Copenhagen Center for Health Technology, National Food Institute
Taxvig, C., Project Manager, National Food Institute
Svingen, T., Project Manager, National Food Institute, Research Group for Molecular Toxicology
Boberg, J., Project Manager, National Food Institute, Research Group for Reproductive Toxicology
Bonomo, S., Project Participant, National Food Institute
02/01/2017 → 31/12/2018
Keywords: PBK modeling, Risk assessment
Collaborators: Brunel University
Project: Research

Optimizing and refining 3D culturing of human stem cells for predictive toxicity
Lauschke, K., PhD Student, National Food Institute
Vinggaard, A. M., Main Supervisor
Emnéus, J., Supervisor
Taxvig, C., Supervisor
Technical University of Denmark
01/12/2016 → 05/10/2020
Award relations: Optimizing and refining 3D culturing of human stem cells for predictive toxicity
Project: PhD

Mechanisms of action involved in chemically-induced effects on male reproductive health
Schwartz, C. V. L., PhD Student, National Food Institute
Vinggaard, A. M., Main Supervisor
Svingen, T., Supervisor
Forskningsrådssponsor
01/12/2016 → 30/11/2019
Award relations: Mechanisms of action involved in chemically-induced effects on male reproductive health
Project: PhD

Hormonforstyrrende effekter af kemikalier i fødevareemballage
Rosenmai, A. K., PhD Student, National Food Institute
Vinggaard, A. M., Main Supervisor
Taxvig, C., Supervisor
Boberg, J., Examiner
Andersen, H. R., Examiner
Si-Lung Lau, C., Examiner
Technical University of Denmark
01/11/2011 → 09/03/2015
Award relations: Hormonforstyrrende effekter af kemikalier i fødevareemballage
Project: PhD

Effects of endocrine disrupting chemicals on adipogenesis and metabolism
Ramskov Tetzlaff, C. N., PhD Student, National Food Institute
Taxvig, C., Main Supervisor
Svingen, T., Supervisor
Vinggaard, A. M., Supervisor
Samfinansieret - Andet
15/12/2014 → 07/11/2019
Award relations: Application of human stem cells for predicting human safety of chemicals
Project: PhD

Identification and risk assessment of unknown contaminants migrating from Food Contact Materials
Pieke, E. N., PhD Student, National Food Institute
Granby, K., Main Supervisor
Smedsgaard, J., Supervisor
Vinggaard, A. M., Examiner
Grob, K., Examiner
Nielsen, N. J., Examiner
Technical University of Denmark
01/12/2014 → 16/05/2018
Award relations: Identification and risk assessment of unknown contaminants migrating from Food Contact Materials
Project: PhD

**Effect biomarkers for endocrine disrupting chemicals**
Johansson, H. K. L., PhD Student, National Food Institute
Vinggaard, A. M., Main Supervisor
Boberg, J., Supervisor
Svingen, T., Supervisor
Madsen, C. B., Examiner
Yding Andersen, C., Examiner
Mazaud-Guittot, S., Examiner
Samfinansieret - Andet
01/09/2013 → 08/02/2017
Award relations: Effect biomarkers for endocrine disrupting chemicals
Project: PhD

**Improving the exposure basis of toxicological research on persistent organic pollutants and their mixtures**
Gilbert, D., PhD Student, National Food Institute
Mayer, P., Main Supervisor
Vinggaard, A. M., Supervisor
Trapp, S., Examiner
Scheringer, M., Examiner
Wania, F., Examiner
Ansat eksternt
15/01/2012 → 15/12/2015
Award relations: Improving the exposure basis of toxicological research on persistent organic pollutants and their mixtures
Project: PhD

**Bioinformatics and toxicology**
Kongsbak, K. G., PhD Student, National Food Institute
Vinggaard, A. M., Main Supervisor
Audouze, K. M. L., Supervisor
Eklund, A. C., Supervisor
Hadrup, N., Supervisor
Nikolov, N. G., Examiner
Boonen, H., Examiner
Legler, J., Examiner
Technical University of Denmark
15/11/2011 → 29/04/2015
Award relations: Bioinformatics and toxicology
Project: PhD

**Development and validation of QSAR models for mechanisms related to endocrine disruption**
Abildgaard Rosenberg, S., PhD Student, National Food Institute
Vinggaard, A. M., Main Supervisor
Dybdahl, M., Supervisor
Nikolov, N. G., Supervisor
Wedebye, E. B., Supervisor
Boberg, J., Examiner
Cronin, M. T. D., Examiner
Kramer, S. T., Examiner
Samfinansieret - Andet
15/12/2013 → 30/08/2017
Award relations: Development and validation of QSAR models for mechanisms related to endocrine disruption
Project: PhD

**MIraculiX: Future risk assessment of chemicals**
Vinggaard, A. M., Project Coordinator, National Food Institute, Research Group for Molecular Toxicology
Boberg, J., Project Manager, National Food Institute, Research Group for Reproductive Toxicology
Perfluorinated compounds (PFC) are a diverse group of synthetically produced compounds, with the unique ability to repel water as well as oil - a property making them ideal for multiple purposes in a variety of consumer and industrial products. PFCs have been measured in the environment, as well as in human blood, urine and milk. Due to their long half-life in humans, there is a risk that exposure to these compounds can cause adverse effects. However, except for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), there is a large data gap regarding toxicological information on PFCs. The specific aims of this project are to perform a broad toxicological in vitro profiling of various PFCs to pinpoint critical endocrine activities •Knowledge building with regards to existing in vitro and in vivo data on endocrine and reproductive toxicity effects of PFCs to be used for selecting the specific PFC and for the planning of dose levels and endpoints for in vivo studies •Investigate endocrine disrupting effects of developmental exposure to a PFC in experimental animal studies. The focus is adverse effects early and late in life, mixture effects, markers for adverse outcome pathways, as well as potential for non-monotonic dose response and low dose effects •Provide knowledge relevant for evaluating the current principles for risk assessment of endocrine disrupters with regards to mixture effects, non-monotonic dose-response and low dose effects. The results of the in vitro profiling of endocrine activity of PFCs is expected to be of value for regulatory considerations on the need for in vivo studies as well as regulatory considerations on how to group PFCs for cumulative risk assessment. The new in vivo data on effects and mode of action of the tested PFC will be of major importance for risk assessment for the specific PFC as well as for this class of compounds in general. If the PFC induces endocrine disrupting effects during development at low doses, this may - together with the critical persistercy of PFCs in humans – highlight the need for more PFC studies, and also be an important knowledge with...
regards to considerations of regulatory actions. The study of potential mixture effects of the PFC with a mixture of known endocrine disrupters is expected to provide further knowledge of relevance for regulatory considerations of grouping of substances for cumulative risk assessment.

Hass, U., Project Manager, National Food Institute, Research Group for Reproductive Toxicology
Vinggaard, A. M., Project Participant, National Food Institute, Research Group for Molecular Toxicology
Christiansen, S., Project Participant, National Food Institute, Research Group for Reproductive Toxicology
Boberg, J., Project Participant, National Food Institute, Research Group for Reproductive Toxicology
Egebjerg, K. M., Project Participant, National Food Institute, Research Group for Reproductive Toxicology
Petersen, M. A., Project Participant, National Food Institute, Research Group for Reproductive Toxicology
Taxvig, C., Project Participant, National Food Institute, Research Group for Molecular Toxicology
Centre on Endocrine Disrupters: DKK4,800,000.00
01/06/2014 → 31/12/2017
Award relations: Endocrine disrupting effects of PFCs: in vitro profiling and effect in rats exposed during development to a PFC plus/minus background exposure to a mixture of known endocrine disrupters
Project: Research

MST Hormon: Development and validation of toxicological test methods for assessment of endocrine disrupting effects of chemicals with focus on development of OECD test guidelines
The focus for the project is: 1.OECD-guideline work: Enhancement of existing regulatory in vivo test methods (OECD TG414, TG 421/422 and TG 443) with regards to detection of endocrine disrupting chemicals 2.Method development related to detection of endocrine disrupters in the new OECD Test Guideline Extended One-generation Study (TG 443) with focus on mammary gland development and females 3.Method development related to thyroid toxicants with focus on human relevance of effects on hormone levels in rats and the implications for brain development in animals and humans.

Hass, U., Project Manager, National Food Institute, Research Group for Reproductive Toxicology
Vinggaard, A. M., Project Participant, National Food Institute, Research Group for Molecular Toxicology
Christiansen, S., Project Participant, National Food Institute, Research Group for Molecular Toxicology
Boberg, J., Project Participant, National Food Institute, Research Group for Reproductive Toxicology
Egebjerg, K. M., Project Participant, National Food Institute, Research Group for Reproductive Toxicology
Petersen, M. A., Project Participant, National Food Institute, Research Group for Reproductive Toxicology
01/01/2013 → 31/12/2016
Project: Research

ComPest: Combination effects of pesticides on birth weight and metabolic programming in rat offspring
Risk assessment of pesticides is generally based on the no observed adverse effect levels (NOAELs) for single compounds. For mixtures of endocrine disrupting chemicals including pesticides, there is human and especially experimental evidence showing that substantial mixture effects on reproductive development can occur even though each of the individual chemicals is present at low, ineffective doses. These findings have major implications for the human risk assessment, as they imply that the current use of NOAELs for single chemicals may lead to an underestimation of the potential risk for humans exposed to mixtures of chemicals. Decreased birth weight, which is an indicator of adverse intrauterine environment, is a common effect for many pesticides. Presently, there is no scientifically robust data available for evaluating potential mixture effects on this endpoint and for selecting the best model for predicting the mixture effects, i.e. dose-addition or independent action (DA or IA). Decreased birth weight is a developmental toxicity effect that is likely to be induced via many different and in most cases unknown mechanisms of action. Consequently, it is relevant to study combined effects of pesticides with dissimilar modes of action and evaluate the predictive value by applying both the IA and the DA model. Low birth weight is in both humans and experimental animals a marker for a non-optimal prenatal development and is generally a predictor for increased risk for a long list of diseases later in life, including obesity and type 2 diabetes. The most widely accepted mechanisms thought to underlie these relationships are those of foetal programming and it is suggested that the foetus adapts physiologically in response to changes in the environment to prepare for postnatal life. Thus, it is considered very relevant to evaluate whether decreased birth weight is related to an altered metabolic programming during development. The project has the following main objectives: •Investigate whether a mixture of environmentally relevant pesticides, with dissimilar modes of action, will cause decreased birth weights at dose levels below NOAELs for the individual pesticides, in a developmental toxicity mixture study in rats. •Based on existing data submitted for approval of the pesticides, evaluate whether the mixture effect is best predicted by the independent action or the dose-addition model. •Investigate the influences of developmental pesticide exposure on metabolic programming of the offspring, using biomarkers for obesity and type 2 diabetes •Give input for regulatory considerations on cumulative risk assessment of pesticides causing decreased birth weight, in order to take account of the potentially serious predictive value of this endpoint.

Hass, U., Project Manager, National Food Institute, Research Group for Reproductive Toxicology
Christiansen, S., Project Participant, National Food Institute, Research Group for Reproductive Toxicology
Vinggaard, A. M., Project Participant, National Food Institute, Research Group for Molecular Toxicology
Boberg, J., Project Participant, National Food Institute, Research Group for Reproductive Toxicology
Egebjerg, K. M., Project Participant, National Food Institute, Research Group for Reproductive Toxicology
Petersen, M. A., Project Participant, National Food Institute, Research Group for Reproductive Toxicology
Taxvig, C., Project Participant, National Food Institute, Research Group for Molecular Toxicology
Scholze, M., Project Participant
Dietary exposure to environmental pollutants and the risk of obesity
The obesity epidemic is known being caused by improper nutrition and inactivity, together with genetic predisposition, but it is generally agreed that these factors alone cannot entirely account for the epidemic. The obesogen hypothesis suggests that dietary exposure to low doses of endocrine disrupting chemicals (EDCs) in early periods of vulnerability may increase the risk of obesity in adult life. Also, most EDCs accumulate in fat tissue, which is of concern since it is known that body fat is not merely a depot for storage of triglycerides, but an endocrine gland crucially involved in energy regulation. We study early markers of the metabolic syndrome in relation to the body burden of chemicals in four longitudinal cohorts in whom we have longitudinal measures of growth and metabolism during various stages of development. In addition we test relevant mixtures of chemicals in cellular models of interest for obesity development.

Jensen, T. K., Project Manager, University of Southern Denmark
Vinggaard, A. M., Contact Person, National Food Institute, Division of Toxicology and Risk Assessment

The Danish Research Council : DKK1,600,000.00
01/01/2009 → 01/09/2014

Award relations: Dietary exposure to environmental pollutants and the risk of obesity
Project: Research

Test strategy for mixtures of chemicals migrating from food contact materials (FCM)
A multidisciplinary project team develops and validate a test strategy for testing migration of chemicals from food contact materials that may pose a toxicological risk. Substances which have the potential to migrate into food are initially screened for a range of toxicological effects in various in vitro tests. Migrates which produce a positive response in these tests are investigated further by chemical analysis in order to identify the toxic substances. In case of the occurrence of several active substances possible endocrine disrupting “mixture effects” are elucidated. In order to access the food safety risk, migration of identified chemicals into food and/or appropriate food simulants is estimated. Project financing This project i is part of a major research initiative funded by the National Food Authorities to study the mechanisms and effect of endocrine disrupting chemicals in food.

Petersen, J. H., Project Manager, National Food Institute, Division of Food Chemistry
Trier, X., Project Participant, National Food Institute, Division of Food Chemistry
Hadrup, N., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Dybdahl, M., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Vinggaard, A. M., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Taxvig, C., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Binderup, M., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment

01/07/2011 → 31/12/2014

Keywords: migration, mixture effect, endocrine disruptors, in vitro tests, screening analysis, identification
Project: Research

Contamed
In the EU project Contamed, DTU FOOD conducts extended developmental toxicity rat studies investigating the possible role of mixtures of 12-14 estrogens, anti-androgens and other classes of EDCs in producing long-lasting delayed adverse reproductive effects at environmentally relevant levels. The endpoints assessed cover effects on male and female offspring during the postnatal development of the pups as well as long-lasting effects in adult offspring, i.e., anogenital distance, nipple retention, mammary gland development, histopathology and gene expression in selected reproductive organs, puberty, malformations of reproductive organs (hypospadias), oestrus cycling, semen quality and sexual dimorphic behaviour. DTU FOOD will also conduct In vitro assays and is responsible for the H295R assay Financial support from the EU seventh framework programme (grant agreement no.: 212502) and Danish Environmental Protection Agency.

Hass, U., Project Manager, National Food Institute, Division of Toxicology and Risk Assessment
Kortenkamp, A., Project Manager, University College London
Boberg, J., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Christiansen, S., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Vinggaard, A. M., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Taxvig, C., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Petersen, M. A., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment

01/05/2008 → 01/11/2012

Keywords: mixtures, endocrine disruptors, human reproductive health, developmental toxicity
Collaborators: Universidad De Granada, Faust und Backhaus Environmental Consulting GBR, University College London, Erasmus MC University Medical Center, University of Sussex, GREEN Tox, University of Bristol, University of London
Mechanisms-of-action of effects caused by anti-androgenic compounds on fetal rat testis development
Anastasiadou, A., Project Participant
Vinggaard, A. M., Project Manager, National Food Institute, Division of Toxicology and Risk Assessment
Svingen, T., Project Supervisor, National Food Institute, Division of Toxicology and Risk Assessment
Project: Research

PANDA: PANDA - Persistent health effects caused by widely used pesticides with antiandrogenic activity
Background: More and more epidemiological and animal studies indicate that pesticide exposure can contribute to disturbance in the development of the male reproductive system. The effects include malformed genitalia, impaired sperm quality, as well as testicular- and prostate cancer. The development of the male phenotype is fully dependent on the influence of androgens formed in the unborn fetus. Animal studies have shown that several pesticides are able to interfere with the androgenic action in the male fetus, either by blocking the androgen receptor or by reducing androgen production.
We have, using an in-house developed computer model, predicted that 8% of all existing chemicals have the ability to block the androgen receptor, indicating that we have only seen the tip of the iceberg. In addition, we have using cell experiments recently found that a number of new pesticides are able to effectively block the androgen receptor. These pesticides are commonly used, and among those with the highest risk of human exposure. In this project a new approach, including cell-based studies addressing anti-androgenic mechanisms, and computer modeling of physiologically-based kinetics (PBK), will be applied of selecting 3 out of 11 pesticides for further study of adverse effects on the male reproductive system. For this a rat model based on in utero exposure and subsequent studies of the male offspring for various defects, hormonal and epigenetic changes, and precursors of prostate cancer will be used. The goal of the project is to provide new knowledge on the potential effects of commonly used pesticides on the unborn fetus, leading to permanent health effects. Two overall purposes will be fulfilled with this project: 1) To generate new knowledge for human risk assessment of specific pesticides which may form the basis for new risk management initiatives by the authorities and 2) To generate knowledge about the applicability of alternative test methods such as in vitro studies and PBK modeling that may form the basis for suggesting new testing strategies and requirements for pesticides. The following specific hypotheses will be addressed: 1.A generic PBK model which includes the fetal compartment is capable of covering the ‘chemical space’ of anti-androgens 2.Our PBK model screening tool will be valuable for prioritizing antiandrogenic agents for in vivo testing, when only in vitro assay data are available 3.Pesticides identified as having potent anti-androgenic effects in vitro and evaluated as being able to reach the fetus will display anti-androgenic activities in vivo 4.Persistent epigenetic effects in terms of DNA methylation will be induced in adult rat offspring after perinatal exposure to a male developmental toxicant 5.Perinatal programming by exposure to anti-androgenic pesticides can induce persistent changes in the prostate, thus predisposing the gland to elevated cancer risks.
Vinggaard, A. M., Project Manager, National Food Institute, Division of Toxicology and Risk Assessment
Svingen, C., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Pedersen, M., Project Participant, National Food Institute, Division of Food Chemistry
Kortenkamp, A., Project Participant, Brunel University
Boberg, J., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Svingen, T., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
The Danish Environmental Protection Agency: DKK3,480,381.00
01/08/2013 → 31/05/2016
Collaborators: Brunel University
Award relations: PANDA - Persistent health effects caused by widely used pesticides with antiandrogenic activity
Project: Research

Teststrategi for blandinger af stoffer der migrerer fra fødevarekontaktmateriale
I projektet udvikles en strategi for test af fødevarekontaktmateriale, for hvilke der er mistanke om at de stoffer som migrerer, kan udgøre et toksikologisk problem som ikke er forudsigeligt eller kendt på forhånd. I projektet udvikles og afprøves en metodik hvor migrater indledningsvis screenes for en række toksikologiske effekter i forskellige in vitro test. Migrater som giver positivt respons undersøges ved kemiske analyser (fx forskellige GC og LC-MS/MS teknikker) med henblik på identifikation af de(t) ansvarlige stof(fer) og udredning af eventuelle kombinations-effekter i tilfælde af at flere aktive stoffer forekommer. Migrationen til fødevarer og(eller) egnede fødevaresimulatorer estimeres når det er relevant. Projektet er en del af et større forsknings Samarbejde betalt af Fødevareministeriet bl.a. med henblik på at studere mekanismer for og effekter af hormonforstyrrende stoffer i fødevarer.
Hadrup, N., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Dybdahl, M., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Vinggaard, A. M., Contact Person, National Food Institute, Division of Toxicology and Risk Assessment
Svingen, T., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Trier, X., Contact Person, National Food Institute, Division of Food Chemistry
Petersen, J. H., Project Manager, National Food Institute, Division of Food Chemistry

Combination of 15 + 30 ECTS points for a Masters project.
**Cocktail: Cocktail - Combination effects of endocrine disrupters**

Project background: Regulation of chemical substances is traditionally based on knowledge of exposure and effects of each substance separately. This requires that one knows how much we humans are exposed to of each compound, as well as the effects of each of compound. For the last twenty years insufficient knowledge about cocktail effects (the effects that can occur when substances are found together) and the absence of reliable tools for risk assessment of chemical mixtures has been a source of concern, both in regards to regulation of chemicals, but also concerning development of products and productions methods. The concern has been that the traditional approach to risk assess one substance at a time does not take into account the effects that can occur when substances are found together (cocktail effects). This concern has led to funding of a 4-year research project, the Cocktail project, supported by the Danish Veterinary and Food Administration (DVFA) Focus cocktail project: The focus of the project is the risk of combinations of endocrine disruptors, and the aim of the project is to provide new practical knowledge on combination effects including effects of each substance and for public exposure to these substances. The primary objectives are: Specific recommendations for risk assessment of mixtures of substances including: ●5-year overview of the Danish population’s exposure to food chemical contaminants ●Knowledge building on combination effects of chemicals ●Knowledge building in modeling of the combination effects and exposure ●Develop strategy for evaluation of food contact materials ●New potential endocrine disruptors and development of methods to find them ●New technologies to elucidate the effect of chemicals mechanisms such as metabolomics and bioinformatics The aim is primarily to develop tools for the assessment of combination effects that can actually be used by the DVFA in the risk assessment of chemicals. Currently, these tools are generally non-existent, even at international level, and must be developed from scratch. This means in a broader perspective, that the goal is to build knowledge, develop methods and establish a strong Danish platform at international level in food chemistry and toxicology, which provides the basis for future preparedness in food chemical safety. The project includes 7 'work packages', each of which focuses on exposure and/or effects and/or risk assessment: ●WP 1 and 2 focuses on experimental work with the aim of generating data and knowledge on toxicological effects. ●WP 3 aims to develop mathematical models, which can be used as in a practical tool for in risk assessment of combinations/mixtures developed in WP 7 Exposure to food contaminants is included in the experimental plan in WP 4 and 6, and a practical approach for the assessment of new food contact materials will be developed in WP 5. In WP 5 and WP 6 the studies will address toxicological effects of new potential problem substances (e.g. substances in food contact materials and mycotoxins in crops).

Vinggaard, A. M., Project Manager, National Food Institute, Division of Toxicology and Risk Assessment
Taxvig, C., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Hadrup, N., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Petersen, A., Project Participant, National Food Institute, Division of Food Chemistry
Petersen, J. H., Project Participant, National Food Institute, Division of Food Chemistry
Rasmussen, P. H., Project Participant, National Food Institute, Division of Food Chemistry
Lykkeberg, A. K., Project Participant, National Food Institute, Division of Food Chemistry
Sharma, A. K., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Pedersen, G. A., Project Participant, National Food Institute, Division of Food Chemistry
Frandsen, H. L., Project Participant, National Food Institute, Division of Food Chemistry
Granby, K., Project Participant, National Food Institute, Division of Food Chemistry
Pedersen, M., Project Participant, National Food Institute, Division of Food Chemistry
Binderup, M., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Hass, U., Project Participant, National Food Institute, Division of Toxicology and Risk Assessment
Trier, X., Project Participant, National Food Institute, Division of Food Chemistry

Danish Veterinary and Food Administration: DKK35,000,000.00

01/05/2011 → 31/12/2014

Collaborators: Fera Science Ltd., University of Rennes, University of Alberta, Brunel University, United States Environmental Protection Agency

Award relations: Cocktail - Combination effects of endocrine disrupters

Project: Research