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Speculating Future Food: Cancer Cells, Food Boundaries and Design Fiction

Shuaiwen Peng

The Glasgow School of Art, Scotland, UK
18273008232@163.com

Abstract. Food is closely connected to everyday habits, cultural identity and ideas of safety. Environmental contamination and emerging food technologies, however, have raised questions about how these ideas might change. Taking concerns surrounding nuclear contamination as its starting point, this paper considers a hypothetical future in which access to conventional food sources becomes severely restricted. Within this setting, cancer cells are introduced as an unusual visual reference for exploring the boundary between food and bodily tissue. The project involves eight food-like prototypes inspired by the morphological characteristics of cancerous tissue. Resin clay, pigments and transparent gel were used to reproduce selected textures and forms, while Japanese Omakase presentation conventions provided a recognisable dining context. The research follows a Research through Design approach, combining visual research, material experiments and iterative prototyping. Particular attention was given to the relationship between biological appearance and food presentation. The design process revealed difficulties in maintaining both qualities within the same object. Some prototypes appeared too similar to medical specimens, while others lost their biological associations when presented as refined dishes. Adjustments to surface treatment, scale and arrangement helped establish a visual balance. The resulting work examines how presentation can influence the perceived identity of an object. It does not propose cancer cells as an edible material, but uses their imagery to question familiar distinctions between food, the human body and cultural taboo

Keywords: Future Food, Speculative Design, Food Design, Cancer Cells, Research through Design

1. Introduction

Food occupies an unusual position in everyday life. It is both necessary for survival and deeply connected to culture, memory and social behaviour. Because eating is so familiar, the assumptions surrounding food are rarely questioned. We normally expect food to be recognisable, safe and acceptable to consume. Yet these expectations can change when the environment or the conditions of food production change.

The development of alternative food technologies has already begun to challenge traditional ideas of what food can be. Cultivated meat, plant-based proteins, and other emerging food technologies are often discussed as possible responses to environmental pressures and changing food systems [1].

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Speculative food design takes this discussion further by imagining how people might live with food technologies that do not yet belong to everyday life. Dolejšová, for example, uses speculative practices to explore possible food futures and the social relationships that may develop around them [2, 3].

Nuclear contamination offers a different perspective. The Fukushima Daiichi nuclear accident in 2011 demonstrated how environmental disasters can affect food production and public perceptions of food safety. Following the accident, radioactive materials were detected in parts of the environment, and restrictions and monitoring were introduced for food products from affected areas [4, 5]. The significance of such an event is not limited to physical contamination. It also alters people's relationship with familiar foods. Something that was previously ordinary can become associated with risk.

These concerns provided the starting point for a speculative scenario in which contamination and environmental instability restrict access to conventional food sources. Rather than identifying a substitute ingredient, the project considers how the definition of food might change under such conditions.

Cancer-cell imagery was selected to examine this question because of its strong association with disease and abnormal tissue growth. These associations contrast with the nourishment and pleasure commonly connected with food. Presenting cancer-cell-inspired forms as dishes creates a visual relationship between bodily tissue and food, allowing their usual separation to be examined.

The purpose is not to suggest that cancer cells are edible or that they should be used as a future food source. The scenario is deliberately fictional. Its role is to create a situation in which an ordinary assumption can be examined from an unfamiliar position.

2. Research questions

The research is guided by three questions:

RQ1: How can speculative design be used to question the boundaries of food under a hypothetical condition of environmental contamination?

RQ2: How can the visual characteristics of cancer cells be translated into food-like forms while retaining their association with the human body?

RQ3: How can food presentation and the omakase format influence the interpretation of these speculative food objects?

3. Literature review

3.1. Future food and speculation

Future food research often focuses on technological alternatives to existing food systems. However, technological feasibility is only one part of the problem. Whether a new food becomes accepted also depends on cultural familiarity and people's expectations about eating.

Dolejšová approaches future food through speculative and participatory design [2]. Rather than presenting future food simply as a technological product, her work creates situations through which participants can imagine different relationships with food. Her later research continues this interest in everyday experiences of possible food futures [3].

The eight prototypes are not intended to function as edible products. Their purpose is to examine how familiar expectations about food might be challenged by an unfamiliar visual reference. The

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emphasis is therefore placed on the cultural interpretation of food rather than the development of new food technologies.

3.2. Speculative and critical design

Dunne and Raby argue that speculative design can be used to explore possible futures and alternative ways of living [6]. It does not necessarily attempt to predict what will happen. Instead, hypothetical situations can make assumptions about the present easier to see.

The nuclear contamination scenario works in this way. It is not presented as a prediction. It is a fictional condition that allows conventional food systems to be temporarily removed from consideration.

The project also relates to Critical Design. Dunne and Raby suggest that design can challenge assumptions rather than simply provide useful solutions [7]. Familiar objects and situations can be made strange, encouraging people to look at them differently.

The relationship between cancer cells and food creates this kind of contradiction. Cancer cells are normally encountered through medical images and discussions of illness. Food, by contrast, is associated with nourishment, pleasure and social interaction. Bringing the two together creates a tension that cannot be resolved simply through visual appearance.

3.3. Food design

Zampollo describes food design as a field that extends beyond the physical food object and includes the wider processes and experiences surrounding food [8]. This understanding influenced the development of the project because the plate, tableware, arrangement and sequence became part of the design.

Presentation provides visual cues that influence how an object may be understood. A biological-looking form displayed as a specimen carries different associations from one arranged on a dining plate. During prototyping, changes in tableware and arrangement were used to examine how these contrasting visual contexts affected the appearance of the objects.

3.4. Bio art

The use of cancer cells as a visual reference also connects the project with Bio Art. Artists such as Oron Catts and Ionat Zurr have explored biological materials, tissue cultures and the boundaries between scientific and artistic practice [9].

Unlike Bio Art practices involving living materials, the present project does not use cell cultures or biological tissue. Cancer-cell imagery serves as a visual and conceptual reference, while the prototypes are constructed entirely from artificial materials. Bio Art nevertheless provides a relevant context for considering how representations of biological matter acquire different meanings outside medical and scientific settings.

4. Methodology

The research adopts Research through Design (RtD). Frayling established an important distinction between research into, through and for art and design [10], while Zimmerman, Forlizzi and Evenson further developed Research through Design as a method in which designing itself can generate knowledge [11].

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This methodology was appropriate for the project because many of the decisions could not be made entirely through theoretical research. The relationship between cancer-cell imagery and food required practical testing through physical making.

The process involved four main stages:

1. Literature and contextual research
2. Collection and analysis of cancer-cell imagery
3. Material and form experimentation
4. Development of the final food presentation

Rather than following a fixed sequence, these stages repeatedly informed one another. Material tests influenced the emerging forms, while changes in form shaped how the objects could be presented as food.

5. Design development

5.1. From nuclear contamination to food

The Fukushima accident provided the initial context for the fictional scenario. Concerns about marine contamination and food safety were particularly relevant to the project's development, given the importance of seafood in everyday diets in coastal Fujian, China.

This regional connection provided a starting point for examining how environmental risk can alter the perception of familiar foods. As the research progressed, the emphasis moved away from representing nuclear contamination directly. Contamination instead became a hypothetical condition through which the cultural boundaries of food could be explored.

5.2. Selecting cancer cells

Cancer cells were selected because they sit at a particularly strong boundary between the body and food.

They originate from the human body, but are normally understood through concepts such as illness, abnormality and mortality. This makes them very different from other proposed future foods such as insects, algae or cultivated meat, which already have some relationship with existing food culture.

Their visual characteristics were also useful for design experimentation. Irregular contours, clustered structures, uneven surfaces and colour variation could be translated into physical forms.

5.3. Translating medical imagery

Individual medical images were not reproduced directly. Instead, selected formal characteristics of cancer-cell imagery were adapted into three-dimensional, food-like structures.

The main characteristics included irregular growth, clustering, uneven surfaces and changes in colour density. These qualities were then simplified and exaggerated during the modelling process.

Some early experiments looked too much like medical specimens. Others became too polished and decorative and lost their connection with biological imagery. These unsuccessful versions helped establish the visual position of the final objects: they needed to remain recognisable as designed food objects while retaining an unsettling, biological quality.

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5.4. Material experiments

The physical prototypes were made mainly from resin clay, pigment, and transparent gel.

Resin clay provided the structural form. After drying, pigments were used to introduce variations in colour. Transparent gel was added to selected surfaces to create gloss and translucency.

The gel was particularly important because the dry clay initially made the objects appear too rigid. The reflective surface introduced a quality closer to moisture or soft tissue. At the same time, too much gloss made the objects look artificial, so the amount and placement of the gel had to be controlled.

The intention was not to reproduce cancerous tissue with medical accuracy. Instead, selected visual characteristics were retained to create objects that could also be recognised through the conventions of plated food.

6. Omakase as a design strategy

The final work consists of eight dishes presented as an omakase meal. Omakase is a Japanese dining format in which diners entrust the selection of dishes to the chef [12]. The format was chosen because it provides a familiar structure for experiencing food. The diner does not know what will arrive next and accepts the chef's decisions as part of the experience.

This relationship was adapted to the fictional scenario through the use of real tableware, controlled portion sizes and carefully arranged dishes. These elements helped establish a recognisable dining context for the eight prototypes.

This creates a change in interpretation. Before learning about the relationship between the objects and cancer cells, the viewer can respond to colour, shape and presentation as they would to food. Once the source of the forms becomes clear, the same qualities can become uncomfortable.

The omakase structure therefore became more than a visual reference. It provided the temporal structure of the work, allowing meaning to unfold gradually rather than being delivered immediately.

7. Findings and discussion

One of the main findings of the design process was that context had a significant influence on how the objects were interpreted. When viewed without tableware, the prototypes were more readily understood as sculptures or biological objects. In contrast, when the same forms were placed on plates and arranged according to food presentation conventions, they became more food-like. This supports the broader understanding of food design proposed by Zampollo, in which food is connected to preparation, presentation and the wider experience of eating [8].

The experiments also revealed the importance of maintaining a balance between attraction and discomfort. If the objects appeared too similar to medical specimens, their food-like qualities diminished. Conversely, if they became overly attractive, their conceptual relationship with cancer cells weakened. The final objects were therefore deliberately placed between these two positions.

The uncertainty between food and biological tissue became an important consideration during the design process. Forms that closely resembled medical specimens offered little connection to dining, whereas more conventional food-like forms weakened the reference to cancerous tissue. The final prototypes retain elements of both. Their presentation is intended to establish an initial association with food before the biological reference is introduced. This sequence creates the possibility of a change in interpretation, although audience responses have not yet been evaluated. The approach is

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consistent with Critical Design, where unfamiliar combinations are used to question established assumptions rather than propose immediate solutions.

The research focus changed during the making process. The initial concern was the possibility of alternative foods under conditions of scarcity. As the prototypes developed, greater attention was given to the visual conditions under which an object becomes recognisable as food. The experiments highlighted the importance of appearance, presentation and contextual information, suggesting that food identity cannot be understood solely through its material composition.

8. Ethical considerations and limitations

The use of cancer as a design subject requires careful consideration. Cancer is not simply an abstract visual form; for many people, it is associated with illness, personal experiences, and loss. For this reason, the project does not intend to make cancer humorous or sensational. Instead, the work uses discomfort deliberately to question the boundary between food and bodily material.

There is also an important scientific limitation. The project does not demonstrate that cancer cells can be consumed or used as a nutritional resource. The prototypes contain no living cancer cells or human tissue and are entirely artificial representations. Similarly, the nuclear contamination scenario is fictional and should not be interpreted as a scientific prediction of the consequences of a future nuclear disaster.

A further limitation is the absence of systematic audience testing. The findings are based primarily on reflective observations made during the design process rather than recorded audience responses. Interviews, exhibition-based observation and comparative participant studies could provide further evidence of how the objects are interpreted. Differences in cultural attitudes towards food and the body would also warrant consideration in future research.

9. Conclusion

The research examined future food under hypothetical conditions of environmental uncertainty. A fictional scenario involving restricted access to conventional food sources was developed to investigate how familiar definitions of food might be challenged. The scenario provided a context for examining food as a category influenced by cultural expectations and environmental conditions.

Cancer cells became the central reference because they represent a strong boundary between the human body and food. Through speculative design, this boundary was translated into a series of physical food-like objects. Research through Design provided the practical method, while Speculative Design, Critical Design, and Food Design helped frame the conceptual questions.

The development process showed that the identity of an object can change considerably according to its context. The use of plates, tableware, scale, surface treatment and sequence made the cancer-cell-inspired forms easier to interpret as food. At the same time, information about their source disrupted this interpretation and created a tension between attraction and rejection.

The project does not argue that cancer cells should become a future food. Its value lies elsewhere. By placing something strongly associated with disease inside the familiar structure of a meal, it makes the boundary between food and non-food more visible.

The research ultimately moved from considering possible future food sources towards examining the conditions under which an object becomes acceptable as food. While future food development may introduce new technologies and ingredients, changes in cultural expectations also deserve attention. The eight prototypes offer a speculative visual exploration of this issue, without claiming to predict future eating practices or establish actual food acceptance.

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