

# Metabolism and Art

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## Abstract

Metabolic arts should be added to the emerging interdiscipline of metabolic humanities and this paper will discuss ways of defining metabolism that might be productive in helping to produce tools and touchstones for metabolic readings of contemporary art before presenting examples of artworks which might be interestingly illuminated by light of this sign, taking time to relish the process of these materially oriented internal analysis coupled with how the work might be considered in terms of its broader implications for the concept of metabolism.

## DOI

[10.69564/ISEA2023-25-short-Rogers-et-al-Metabolism-and-Art](https://doi.org/10.69564/ISEA2023-25-short-Rogers-et-al-Metabolism-and-Art)

## Introduction

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Among the many challenges of our Anthropocene moment, is the new attention that must be paid to how humans and other species are embedded within, exposed to, and even composed of the very materiality of a planet that is rapidly changing. By focusing on metabolism, understood as “the chemical processes that occur within a living organism in order to maintain life; the interconnected sequences of mostly enzyme catalyzed chemical reactions by which a cell, tissue, organ, etc., sustains energy production, and synthesizes and breaks down complex molecules” (Landecker 2011). As a fundamental biochemical process of life, metabolisms are ubiquitous and multilayered, ranging from distinct multispecies bodily processes, to a variety of chemical transformations across many organisms on a planetary scale, atmospheric and respiration relations between human and plant metabolisms, the body as an environment, to notions of metabolism in a more purely metaphorical sense in aesthetics. Tracing the workings of metabolism is a method for connecting change and dysfunction on a bodily, social, and earth-wide scale. As John Bellamy Foster (1999) explains, Marx conceived of a dysfunction in the form of a metabolic rift as a separation “between humanity and the soil, reflected in the antagonism of town and country” (399).<sup>1</sup>

Metabolic humanities appear to be a rising sign under which medical humanities, environmental humanities, and agricultural corners might be united, and metabolicarts may be a productive stage for the three-legged stool of ASTS to balance in tension around the subject.<sup>2</sup>

Metabolism might be taken to mean many things from distinct multi-species bodily processes, to a range of chemical transformations across many organisms on a planetary scale, atmospheric and respiration relations between human and plant metabolisms, the body as an environment, to notions of metabolism in a more purely metaphorical sense in aesthetics. This is not to suggest that metaphor is absent in what is generally understood to be the scientific notion of metabolism, indeed sociologist Hannah Landecker has shown how very entangled social conditions and metabolic science are and have been.<sup>3</sup> Landecker suggests that metabolism was foreclosed by understanding the body as a machine, with a ledger, but this could also point to understanding the body as a business, with immediate implications about capital and a relationship to Foster's Marx.

Metabolisms are ubiquitous but may be most noticeable in states of dysfunction. These dysfunctions are the basis of medical sciences, the source of new ways of conceiving of ecological relations in a climate-changed world, and are a longstanding way of diagnosing philosophical indigestions. Metabolism can be the constant that brings methodological tendencies to the fore as a shared subject, and yet the variable historical understandings of metabolism alone give rise to ages possible metabolic unfoldings so that our studies need not be bounded by the current state of metabolic science and indeed, as ASTS scholars would argue, this is best understood in its social, political, philosophical, and historical contexts. Metabolism serves so many possible needs for scientists, scholars, and artists by providing metaphors, models, puzzles, solutions and balances. Metabolic science is built on a stack of ever-modified metaphors,<sup>5</sup> including the metabolism as an engine or motor (fast/slow and often an emphasis on the notion of fuel/energy sources), furnace (hot/cold), “chain reactions,” “chemical cascades,” the “chemical carnival,” and many others.<sup>6</sup> Science is implicated in metaphor thinking, as even the classic experiment asks us to make correspondence between the specific findings on the bench and the broader world, and this extends out to our public understandings of science, often with further analogies which both simplify and make more culturally complex these concepts. We suggest a focus on Landecker's etymology for the term *Stoffwechsel*, translated as “total metabolism,” with a further emphasis around the “stoff” or in English “stuff” of the process to emphasize the insistence bioartists have shown in exhibiting the stuff of living things and parts.<sup>7</sup> This emphasis on stuff has been important in bioart as such work has avoided distance and representation except by a part of the actual living tissue, bacteria thing and at the same time it has insisted on pulling against conceptual art to attempt to produce in material those ideas. Being in the presence of stuff has been a hallmark of bioart and an emphasis on process may well be the hallmark of the metabolic arts.

The dual use Marx and Landecker make of, on one hand, critiquing soil chemistry or medical genetics, and on the other hand, using those subjects as the basis for their thought, is a situation shared by bioartists who are often using the very biological and biotechnical materials they are critiquing. Enter metabolic arts: drawing on metabolism from the sciences, embodied experience of metabolism, and the potential of laboratory and home metabolism practices to create encounters with life and life processes, many artists and art-aligned practitioners have created art and art-science works that relate to metabolism. We observe and anticipate that many

artists may return to Marx's original thinking about metabolism, particularly, his interest in the way that capitalist systems attempt to disentangle plants from animals including people, one natural and functional system was separated into two sets of problems with planetary implications: urban/rural waste and food insecurity/soil depletion.

## Metabolic arts

The metabolic gaze can enrich understandings or experiences of a range of contemporary life-science engaged artworks. Tissue Culture & Art (TC&A), made up of Oron Catts and Ionat Zurr, along with collaborators specific to individual works, have offered a trajectory of artworks spanning from 2016 to the present, including iterations of *COMPOSTUBATOR* and *Sunlight Soil and Shit (De-)Cycle (3SDC)*.<sup>8</sup> While each work is distinct, they represent the formation of the artists' thinking on these subjects over a number of instantiations. In the *COMPOSTUBATOR* series, a compost heap powers an incubator for sustaining a group of cells, generally through microbes heating water in conduit which flows past the incubator chamber and regulates the temperature. *3SDC* was designed as a series of engagements around a set of agricultural tools with an emphasis on considering their implications and the philosophies behind these and other proposed system changes. *3SDC* was launched with the *COMPOSTUBATOR* in Freemantle, Australia, positioned by the artists on their project website in relation to agricultural systems: "The heated incubator sustains the growth of cells in a tissue culture flask to create what is today known as "lab-grown meat." This type of "meat" is the cornerstone of what is called Cellular Agriculture – growing animal products without the animal." A second portion of the project is the use of *Alkaline Hydrolysis* (also Aquamation or Biochemiation), based on an 1888 process for turning farm animals into crop fertilizer. The artists created their own version by hacking brewing equipment to break down much smaller animal bodies (meat and fishing waste) to fertilize the *Hydroponic Garden*, which is ironically supported by artificial lights driven by solar panels when possible. All of these elements are connected by the *Control Room* which gathers data from sensors across the project (thermometers, CO2 levels, pH monitors, cameras, etc.) The project aims to highlight the problem of increasing metabolic rifts in order to solve agricultural issues, something that seems implicit in many of the lab-based food systems proposed in the public sphere today. The artists write: "SymbioticA's 3SDC builds resources to

enable the community to accelerate metabolic rifts in agricultural innovation. This project considers whether the precursor to sustainable food systems will be the creation of a metabolic rift – where the means of production will grow ever distant from nature." The artists directly invoke Marx's metabolic rift as the target of their investigations by explaining that the exhibition is durational and will be changed over the course of the exhibition. Their aim at "maintaining the utmost clarity and transparency of our process is the key to promote understanding of the impact of metabolic rifts." TC&A are working with metabolisms, in its nuanced form at the microbial level and at the broader level of our food system.



Figure 1. Baum and Leahy's *Cometabolise: A Holobiont Dinner*, 2021. Detail installation photograph from *The World is in You*, Medicinsk Museion and Kunsthall Charlottenborg, 2021. Photo: David Stjernholm.

Baum & Leahy's *Cometabolise: A Holobiont Dinner* (2021) was a living sculpture and an exploration in making the idea of the holobiont more familiar for viewers (Figure 1).<sup>9</sup> A holobiont is an assemblage of a host and other species living in or around it that together form a discrete ecological unit.

From a holobiont perspective, our bodies are permeable living environments for our cells and the cells (and whole bodies) of other living things. It expands and blurs the notion of the host as a unit which could ever be extracted from this entangled set of relations. The artwork insists on the overlapping metabolic processes of the multispecies beings which help to metabolize our food. The artwork emphasizes the idea that bodies are porous, multispecies entities, highlighting the fact that humans and microbes eat and drink together. This bespoke dining set contains a sourdough culture held in a spherical glass carafe reminiscent of a bioreactor. A closed container for a starter culture is, of course, one of our most familiar bioreactors. The piece reminds us of the domestic nature of metabolism and invites thoughts of kitchens and laboratories. The artists emphasize the

performative nature of the work as the microbes are constantly metabolizing and are fed while visitors are offered bread baked from the starter at the communal dining set.

George Gessert and Violet Ray's *BREATHE* (2022) is a video piece investigating plant metabolism and its circular processing with our human breathing. Given his history with plants as a primary subject and medium for his artwork, Gessert's work with plant metabolism is an obvious extension of those concerns. The yet unexhibited filmic work which was created with Gessert's longtime interlocutor but new collaborator media artist Violet Ray, poetically explores the metabolism of plants through photosynthesis by exhibiting the process at a cellular level and using text to invite audiences to connect their own breath to the cycle of the plant's photosynthesis and respiration. The artists ask us to pace ourselves with plants. As Gessert puts it, as we think of metabolism, "Why stick to humans and animals? Photosynthesis creates the air we breathe and is a key part of the planetary metabolism that supports most life on earth."<sup>10</sup> This focus on the larger cycles that metabolism is implicated in overlaps with the concerns of scale that appear across the metabolic arts.

Tagny Duff's *Wastelands* (2015-2018) explores shit as an energy source in a speculative future without fossil fuels. Duff explores a deep future 500 years away when humans, through collaboration with bacteria and viruses, use their own feces as an energy source in small, portable bioreactors.<sup>11</sup> The *Wastelands* Project relies on Duff's many years of experience working with biotechnologies in its artistic practice, with a particular focus on viruses and on White Heather Hunter's co-invention of a new bioplastic with art conservator Courtney Books. The latter provided the basis for the biomaterial development used to construct the bioreactor bags for the project. Metabolic ubiquity can create complications since living things always involve metabolisms but all art with living things may not query those processes or engage them directly. Yet, the search for metabolisms may provide new insights and new places of tension for contemporary arts about life and the Anthropocene.

## References

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8 See the Tissue Culture & Art's pages at Compostcubator 0.1 & 0.2 – The Tissue Culture & Art Project (tcaproject.net) and 3SDC Sunlight Soil and Shit, sunlightsoilshit.systems.

9 For more, see Baum & Leahy's art pages at Baum & Leahy, baumleahy.com.

10 Personal correspondence with the artists, February-April 2022.

11 For more, see Tagny Duff's project page at Wastelands – Thoughts, images and experiments considering human-microbial relations on Earth in 2517, wordpress.com, and Whitefeather Hunter's documentation page at biotechnofeminism: laboratory craft | whitefeatherhunter