Working Paper

The anthropologist and the bioengineer: A theoretical reflection on some preconditions for ethnographic collaborations in Personalized Medicine

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The anthropologist and the bioengineer: A theoretical reflection on some preconditions for ethnographic collaborations in Personalized Medicine

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Abstract

By applying genomics research and cutting-edge technologies to the imaging and analysis of molecular-based biomarkers, precision, or personalized, medicine (PM) is a groundbreaking approach to medical care which aims to predict, prevent and treat diseases by providing healthcare according to the genetic variability of individuals and the socio-environmental context in which they live. The impacts of PM on future use and access to healthcare will surely be enormous, and, anthropologists should not disregard them. As the most important outcome of biotechnological research, PM is generated in the lab, making anthropologists reflect about how to grasp engineers' and other experts' underlying modes of knowing *inside* this emergent fieldsite and how to analyse the discursive transduction of the outcomes of such modes through everyday practices *outside* it. The purpose of this paper is to reflect on this hypothesis, stressing that an experimental ethnographic collaboration might configure an effective way of doing this.

Keywords: Personalized Medicine; Precision Medicine; Biotech Labs; Participant Observation; Ethnography; Experimental Collaborations

Resumo

Aplicando a investigação genómica e tecnologia de ponta à imagiologia e à análise de biomarcadores de nível molecular, a medicina de precisão, ou personalizada, (MP) é uma abordagem biomédica inovadora que visa prever, prevenir e tratar doenças fornecendo cuidados de saúde de acordo com a variabilidade genética dos indivíduos e o contexto socio-ambiental em que vivem. Os impactos da MP no acesso aos cuidados e aos serviços de saúde no futuro serão certamente enormes, e, os antropólogos não devem desconsiderá-los. Como resultado mais importante da investigação biotecnológica, a MP é gerada no laboratório, instando, por isso, os antropólogos a refletir sobre como capturar os modos de conhecer dos engenheiros e de outros especialistas *dentro* desse campo emergente e, adicionalmente, a refletir sobre como analisar a transdução discursiva dos resultados desses modos nas práticas quotidianas *fora* do laboratório. O objetivo deste artigo é refletir sobre a hipótese de as colaborações etnográficas experimentais poderem configurar um meio efetivo de se conseguir isso.

Palavras-chave: Medicina Personalizada; Medicina de Precisão; Laboratórios Biotecnológicos; Observação Participante; Etnografia; Colaborações Experimentais

Introduction

As major steps in biotechnological development, the discovery of the protein synthesis mechanism (Hoagland et al. 1958) of the tRNA molecule and the sequent antisense therapy that followed it (Zamecnik & Stephenson 1978), complemented by the discovery of the PCR mechanism by Kary Mullis' team in the 1980s (Mullis et al. 1986), have transformed both biomedicine and, to a great extent, ethnography's *modus operandi* (Rabinow 1996; Rabinow & Stavrianakis 2013). In the first milieu, we are now witnessing the emergence of a new form of biocapital (Sunder Rajan 2006) built upon a new medical knowledge-power connection – precision/personalized medicine. In the second milieu, the production of new "epistemic things" (Rheinberger 1997), and new experimental collaborations (Rabinow 1996), provoked a profound reflection about social sciences' epistemology and anthropology's "mode of production and being" (Rabinow & Keller 2016). In PM-related anthropological inquiry, the result of this reflection was the so-called collaborative turn, an epistemological shift of focus from the Malinowskian fieldwork model to interdisciplinarity and experimental ethnographies. This enabled new situations to be confronted and new concepts to be used, seeking, by such means, to respond to the new "demands of the day" (Rabinow & Stavrianakis 2013). The underlying rationale of such shift is the fact that, in PM-related fields, "the dominant knowledge production practices, institutions and venues for understanding human things in the 21st century are institutionally and epistemologically inadequate" (Rabinow & Keller 2016). The case is that, when we look at PM, we seek primarily to study *up*, *sideways* and *through*, which brings important limitations for Malinowskian participant observation which primarily studies *down* (Nader 1972; Hannerz 2010; Ortner 2010), especially when we are trying to study experts' work in "their" biotech world (Viseu 2015). This world is usually closed and located apart from outsiders' eyes, both literally and symbolically. Additionally, its extreme business-like specialized facilities and functionalities create a heterotopy, an unsituated situation, located somewhere outside the common world.

Some questions arise here, such as: how shall outsiders in general vindicate access to biotech experts' knowings and doings, that is, their particular methods, or "knowledge

devices",[2] by which they successively make entangled more-than-human naturecultures (cf. Haraway, 1997), and bring them into the social light? And we anthropologists, how shall we get access to such knowings and doings in order to effectively interpret their place, value and politics in the common world?[3] Facing these questions, this paper aims to reflect on the limitations of Malinowskian-like ethnographic endeavour to address in practice this relatively new world by the interpenetration of two vectors: the advantages of collaboration to reach biotechnical experts' modes of knowledge *inside the lab*, favouring the integration of anthropologists in a transepistemic arena of research (cf. Knorr-Cetina 1982) where they may be involved in epistemic partnerships and sharing (Holmes & Marcus 2008); and the downstream advantages of collaboration to transduce the results of those partnerships into practices adopted *outside the lab* by policy-makers and laypersons, who are themselves special kinds of experts (Fals Borda & Rahman 1991; Holmes & Marcus 2008). Together, reflections on these two vectors may help us to envision the role that biotechnological discourses and practices around FM occupy in the *deep play* of modernity and to identify some of the resulting *ethical plateaus* (Fischer 2004) – such are, I stress, the most important outcomes of collaborative ethnographies on the study of biotechnological worldmakings.

Collaborating inside the lab

PM is developed *inside* the lab. The admission of ethnographers into the lab environment is of important interest for the anthropology of the contemporary (Holmes & Marcus 2008). A sign of the times is that the "experimental ethos" of the science lab is now disseminated across the social fabric (Holmes & Marcus 2008). Inside the biotechnology lab, this ethos has, in recent years, reflected an unusual exploration of the *jeu des possibles* (cf. Jacob 1981) by producing specific synthetic-biological hybridizations, thus provoking new arrangements of human/non-human intra-actions

[2] I refer here to the notion of "device" from Foucault's "dispositifs de governmentalité" with a slight evolution promoted by the ontological turn, when it came to signify a particular type of assemblage, or arrangement, namely in Deleuze and Guattari's philosophy. The method as "knowledge device" means that it shares a particular characteristic with other forms of power-knowledge: here, methods are "patterned teleological arrangements which assemble and arrange the world in specific social and material formations" (Law & Ruppert 2013: 229).

[3] The inclusion of outsiders inside biotechnology discourse is an imperative, based on the fact that any technology or science is immersed in the social fabric. No scientific knowledge nor technologies, including, of course, biotechnologies, are "fixed entities or a priori sets of facts but they take shape in social contexts, including in debates over biotechnologies" (Bronson 2014: 581).

(Barad, 2007). Such new arrangements give rise to new modes of social assemblages (cf. Latour 2005), simultaneously conditioning the change of the possibles and boosting the revelation of emergent (Rabinow & Dan-Cohen, 2006; Faubion 2016) natureculture hybrid forms, which, in the end, will change social common understandings about the world (Haraway 2003, 2016) and about how to live in it (Richards & Ruvenkamp, 1996). Consequently, they will challenge the anthropology's knowledge devices and equipment in order for these to successfully address such change as well (Rabinow, 2003).[4] Also, the very scope of ethics is challenged by the discovery or invention of such forms (De la Bellacasa 2010) in order to adjust to particular emergent modes of what Karen Barad called "posthumanist performativity" (Barad 2003).

This "quickening of the unknown" calls for an "epistemology of surprise in anthropology" (Guyer 2013), which may have the ability to grasp the conditions under which discovery and invention happen, as well as their effects on society. This invites anthropologists to shift the contexts of their endeavour and to agree "to take knowledge practices in the plural [and to reflect on and to practice] new modes of apprehension" (Strathern 1995: 3). In order to achieve this ability, an epistemology of surprise needs to embrace an equipment composed by "the intellectual instruments through which thinking might be facilitated" (Strathern 2016: 382), aiming to capture the movement space, that is, the setting "in which both the subject conducting inquiry and the objects and objectives of inquiry are in motion" (Rabinow & Stavrianakis 2016: 405). This kind of epistemology makes ethnography an experimental system inside a broader experimental system. Through such motion inside the lab, ethnography becomes "a differential generator of surprises, capable of displacing meanings in material spaces of representation (fraction patterns, array counts) – which [in the particular case of PM] turned protein synthesis into a tool kit" (Fischer 2004: 389) for rewriting life and (re)negotiating it in what we may call a genomopolitics. As an experimental system,

[4] One of the main limitations of classical knowledge devices use in the contemporary is the fact that humans' biological/bodily dimension is being virtually obliterated from social anthropologists' ethnographies (Ingold, 2016). In addition to the problem of truncation, which clashes with anthropology's holistic epistemological a priori premise, this fact brings to the debate the rise of the major problem of the centralization of analysis on social representations and practices instead of in bodily mediated senses and experiences. This amplifies the effects of cultural relativism, which, as we know, was at the very basis of the textual crisis in anthropology, together with the exaggerated, denunciatory, critique (Howes, 1990; Heyman 2016; Stan 2016). If we have to choose an advantage of the ontological turn to anthropological analyses, this must surely be the fact that the material/bodily dimension was rescued and finally reappears on the page. Cosmological ontological entanglement reminds us that humans are more than abstraction and selves; they are biocultural entities (Fuentes 2013; Pálsson 2013).

ethnography will understand the lab as a *third space* that produces prototypes.[5] And as an experimental system, ethnography is assumed as being a space "of complex assemblages and big projects through which [it] operates and defines its objects of study. [This new form of ethnographic inquiry is] established alongside the traditional serendipitous path of fieldwork, and involve[s] explicit intellectual partnerships with persons who might otherwise be viewed as facilitators or subjects of research" (Marcus 2014: 399).

Such "intellectual partnerships" mean that, once *in the lab,* anthropologists should manage their presence by avoiding internal differentiation and promoting the spontaneous emergence of a lateral knowledge, that is, a way of knowing that "intends to rethink, adapt, and enact ethnographic method in a novel way that involves a different calculus, recognition, and practice of relations between anthropologists and subjects" (Marcus 2013: 206). This transformation of the relations between anthropologists and subjects is crucial in a collaborative endeavour. Traditionally, these subjects were treated as informants and the ethnographer positioned herself outside their condition as a means of maintaining a "distant gaze", while in experimental collaborations, these subjects are experts who must be treated as partners, interlocutors or even special para-ethnographers. This way, the distinction between expert and non-expert is diluted and loses its significance, opening a pathway to the discovery of lateral realities enclosed within the experts' practices and between them and those of anthropologists.

This kind of management will allow the anthropologist to visualize the adjacencies between the not yet been, the moving being, and the possible becoming that is sequentially revealed along the experimental systems' "economy of displacement" (Marcus 2013: 206). It also will allow the anthropologist to contextualize those adjacencies in a broader framework where she positions herself among complex assemblages and raises new questionings (Rabinow 2011). Ethnographers, therefore, will be "able to *observe the observer observing* while having dialogic relationships with subjects within the literal spaces of scientific work (labs, seminar rooms, conferences, bars, etc.)" (Marcus 2013: 209, italics in the original). This broader framework is the place where *deep play* is played and where *ethical plateaus* are revealed. As Fischer

[5] A prototype "is a version of a product, or a set of concepts in material form, far advanced in development, but still open to revision, experiment, and some rethinking, based, in part, on engagement with 'others' (end users, research subjects, nonexperts, amateurs) as inside respondents, if not late-stage partners" (Marcus 2014: 399).

points out, "the test of an inventive, illuminating or instructive ethnography is how well it opens up such *deep play*, while remaining accountable [read "ethical"] to both specialist and generalist audiences" (2004: 389).

The opening up of the *deep play* is not a practice to be developed *inside the lab*, but must be envisaged as a network constituted by both capillary and centralized moments of power (Heyman 2016), along which, and through the interstices formed in between, biocapital is stimulated, produced and flows (Sunder Rajan 2006), through and via new scales, such as the genomic, in the case of PM. So, more than focusing on results and writings, ethnographers must address the ecology of practices, simultaneously from the same and from a different perspective which Isabelle Stengers (2005) gives to it, i.e., an ecology focused on the predicament of situated practices and knowledge, as Stengers stresses, but one that doesn't isolate the sciences in their own epistemological and practical fields, but instead expands in and by collaborative and interpenetrative epistemologies and practices.[6] The time has come to look at the co-conscious transitions between *experimentations*, now extended beyond the phenomenological co-conscious transitions between *pure experiences* that William James once advocated (James 1904). It is these social dynamics between experimentations, I think, that we must grasp in order to perform a true anthropology of the contemporary. The hypothesis is that the grasping of such social dynamics may open the path to circulate inside the cosmopolitics of PM, namely throughout the apprehension of the Foucaultian *régimes de véridiction* underlying those co-conscious transitions in a broader socio-technical and political context (Stavrianakis 2009).

The seizure of those *régimes de véridiction* thus presupposes "a kind of conceptual work with partners in fieldwork that both revises preconceived research frames to their core and remains legible in and constitutive of whatever ethnography claims for itself as a product of research" (Holmes & Marcus 2008: 83). This co-construction of ethnographic inquiry dilutes the pre-existing epistemological differences between the *régimes* of anthropology and biotechnology and opens the way for the emergence of ethnographic projects "out of a series of in-fieldwork collaborative articulations of orienting questions and concepts that the research situation is felt, if not understood, to present to its partners" (Holmes & Marcus 2008: 83). According to these authors, this

[6] About this theme, see, among others, the volume edited by Maria Carla Galavotti (2003) – for more details, see references below.

collaboration implies a *deferring* of the ethnographic work planning, which is crucial, as by deferring the orienting questions, the anthropologist is opening a space for practical and scientific mutual recognition. From the anthropologist's perspective, such recognition implies i) that she accepts the fact that the outcomes of collaborative encounters are uncertain (Holmes & Marcus 2008) and that collaboration is not always successful (Rabinow 2011); ii) that biotech researchers have their own situated discourses, so the anthropologist should keep in mind that as experts, biotech researchers are themselves somehow critical about the conditions in which they perform their work, thus there is a need to limit the level of an eventual critical eye (Holmes & Marcus 2008:84); iii) that she must relearn the ethnographic method departing from the epistemic partners' perspectives about how they understand and live in our world (Holmes & Marcus 2008: 84); and iv) that she needs to accept the epistemic partners' autonomy in developing intellectual operations on their own, thus resisting the established image of the complementary roles of ethnographer-informant (Holmes & Marcus 2008: 84).

I also agree with Rabinow in thinking that "the object of anthropological science [is] the dynamic and mutually constitutive, if partial and dynamic, connections between figures of anthropos and the diverse, and at times inconsistent, branches of knowledge available during a period of time" (2008: 4). Furthermore, I stress that the apprehension of such connections urges anthropologists to follow scientists and engineers through society, as Bruno Latour (1987) says. Experimental collaborations are, indeed, more-than-human constellations of meaning inscribed in larger socio-technical assemblages. My invitation is that we also explore others of those third spaces, without which we seize but few of those dynamics' facets of experimental collaborations in PM-related ethnographies.

Collaborating outside the lab

PM is f(o)unded and implemented *outside* the lab. As I see it, any experimental milieu is a socio-technical assemblage inside a much broader social system where para-ethnographic discourses and reflections are sometimes even simultaneously common and heteroglossic. Discourses have a crucial role in the understanding of social reality and in linking experts and citizens (Bakhtin 1981; Harré & Gillett 1994; Fischer 2003).

That said, the excessive focus on practices, as Law (2011) advocated, reveals a partial, thus biased, reality. We face here a concomitant problem, I think, one that theorists and researchers in the medical anthropology of the contemporary, or even in social studies of science and technology, must address more deeply – the problem of two discourses, or even the ambivalence within the mainstream discourse on technoscience, namely biotechnology, which is marked by an ambivalence of economic and social values (Klecun 2016) or even a dichotomy between normalisation and diversification (Kaufert & Kaufert 1996). Such ambivalence points out the terms in which the *deep play* is played, since it dichotomizes the interests of technology developers and those of the general public. While the formers' discourses reflect an ethics of normalization through expressions like "rates and ratios, survival times, the calculation of risk, mortality and cost-effectiveness" (Kaufert 2000: 166), those of the latter refer to the central ethics of salvation, a kind of a soteriology revealing that persons live and interpret biotech and biomedical social roles differently. It is by means of discourse analysis that we may envisage the potential unethical issues enclosed in the ideology that underlies the contemporary neoliberal *deep play*. This duplicity and ambivalence of PM-related discourses refers to a double understanding of the implications of biotechnical construction of health and illness on the adjacencies between the not yet been, the being and the becoming, whose configurations determine the broader framework where the anthropologist positions herself between complex assemblages and where she raises new questionings.

In order to grasp the broad spectrum of the implications of PM in society, we must thus extend the case towards the exterior of the lab, both upstream and downstream, that is, collaboratively observing the discursive formalization of biotech researching protocols and the way these are framed and included in the rhetoric of innovation and disruption (Lepore 2014). In the end, the primacy of the interest that Riles (2015) refers to as an imperative for collaboration is rooted in this neoliberal principle of the value creation. If it is certain that we must moderate the critique *inside the lab*,[7] it is also certain that we

[7] It is understood somewhere that the resistance from the upper echelons to the acceptance of the anthropologist getting into their fields in order to do participant observation is due to these latter reactive attitudes to the critique. It is also stated that, particularly in the post-modern moment, anthropologists have exaggerated their critique, turning it more into a denunciation than a scientific analysis. The upper echelons' reactive attitude may reflect this unfortunate vice that some of us exaggerated, and may even have contributed to anthropology's crisis. It is up to us to recover their trust, namely showing them that our work is reliable and it is based on scientific criteria and less on moral ones. It would thus avoid anthropologists turning into mere "moral voices" (Dullo 2016) propagating a romantic populism, which

must be cautious about the value creation principle as a central constitutive element of post-modern and neoliberal *régimes de véridiction*. So, critique must appear on the page, even if it is also *deferred* along with other formalities of experimental collaboration projects.

That said, in order to extend the case both up and downstream of the lab, I propose that we consider transduction a main function of ethnography, in agreement with Helmreich's process of constitution, structuring and modification of spatial and logical relations between different forms of experience (Helmreich 2007). Inside necessarily transepistemic collaborative projects, we are, in fact, confronting a radical linguistic difference between constitutive epistemic communities that is not resolved by translation. Helmreich draws, among others, on Gilbert Simondon's theory of individuation, during which living creatures and non-living objects evolve or decay towards a final form (Simondon 2005). Along this process, information moves from stage to stage without its quality as information being altered (only its mode of existence changes). This is the central idea I want to adopt from now on. When I speak about accepting transduction as ethnography's main function, I am referring to a combination of Simondon's transductive flow of information with the biological and chemical processes of communicating and signalling between different kinds of cells or other biosemiotic *corpora*. In a collaborative fieldsite, we can imagine all the experts, including the anthropologist, as different such kinds of biosemiotic *corpora*, which, in the end, appear as different forms of information processors. That is, all experts share a common nature, but they are still different in their special functions. As a transducer, the ethnographer performs a function similar to that of biochemical ligands, as she transfers information between agents and between (science) cultures. Furthermore, through collaboration, the ethnographer can increase the transductive effect by linking discourses, sensations, experiences and practices, that is, arrangements of information, between different forms of fieldsites, such as conferences, laboratorial experimentations, and society at large. These three main levels of information circulation are then linked throughout ethnographic transduction, and, since they are taken together, they configure one and same mode of (cosmological) experimentation: collaboration (here broadly understood as a means for adaptation). It is this

"intersects with intensified academicism in the form of arch-scholarly performances of would-be radicalism" (Heyman 2016:182).

cosmological dimension that ultimately makes collaboration anthropologically meaningful.

Among all the forms of ethnographic experimentation, the biotech-related is one of the most complex. As Fischer (2007: 38-9) recalls, "the spaces of interactions among [the] technosciences become particularly complex and interesting sites for cultural analysis – not only for understanding emergent technologies themselves but also, more importantly, for tracking implications carried over into culture at large". Such *sites* are important *ethical plateaus* which constitute a "network of transductions [that the ethnographer helps to make] audible, visible, perceptible, and even, sometimes, democratically subject to accountability" (Fischer 2007: 42). It is through such democratic accountability that we arrive at PM's very destination: society.

Among others, the anthropologist Christopher Toumey has been especially concerned with this arrival. His studies focus mainly on the conditions by which nanotechnology is understood by para-ethnographers such as laypersons. His work is founded on experimental collaboration and he has been involved in projects like South Carolina Citizen's School of Nanotechnology (SCCSN), whose main goal is to detect what society at large knows about nanotechnology and its implications. In the project, bioengineers, teachers and other lab technicians collaborated, as well as the public and the ethnographer. Toumey found that people with different backgrounds and interests see nanotechnology differently; hence, there is no unique definition of nanotechnology (Toumey 2016). This kind of interpretive difference, Toumey argues, results from the fact that public engagement with nanotechnology is barely developed (Toumey 2011). During the SCCSN project, Toumey accidentally found that this detachment was caused by the mode by which information was being communicated. He concludes that "the process of building public understanding must not be a one-way communication from active experts to passive laypersons. On the contrary, it must include ways for laypersons to express their questions, their concerns, and their values, and for them to receive responses from experts" (Toumey 2006: 29).

The kind of collaboration in which Chris Toumey was involved shows us a means to identify *ethical plateaus* that we wouldn't detect otherwise. Here, too, collaboration proves to be an effective toolkit. Toumey situated himself between experts and between them and laypersons and has transduced information through dialogue in a two-way

communication process. In brief, theory, laboratorial practices and participated implementation were linked by a workplan that became possible by means of collaboration. Eventually, collaboration is the only way of achieving such an ending. By linking all the parties, known as stakeholders, in the gospel of innovation (Lepore 2014), collaboration plays a paramount role in bringing technology developers and users closer, thus promoting democracy. And this is particularly achieved thanks to the versatility of the anthropologist's role, who as a biochemical ligand, links different modes of information processing.

Conclusion

By way of conclusion, we may agree that when inquiring into the contemporary and the emergent, "anthropologists … found that their new collaborative methods ultimately produce more interesting insights [than the traditional ethnographic modes of inquiry]" (Riles 2015: 169). This is especially true when the ethnographer – in spite of the "view from afar" strategy – wants to move into the biotech lab while remaining a well differentiated and contrastive observer in relation to the informants. In this type of fieldsite, classical ethnographer/informant differentiation should not be tolerated. Indeed, based on the many reflections presented above, considering the difficulties of doing participant observation in lab-type sites, collaboration seems to be the best path to follow. Through collaborations based on interlocutor/interlocutor relationships, both the ethnographer and the biotech engineer free the way for the emergence of collateral realities, and, thus, they starting performing a first-level transduction, making the anthropologist's work easier in performing successive transductions closer to other disciplines' ecologies and, in the end, closer to society at large. Furthermore, the ethnographic treatment of the biotech lab as a fieldsite implies that we look at it as a different kind of classical Malinowskian field. In this case, we shall consider the primacy of the field as a game board (in Bourdieu's sense) where relative areas of expertise are put into play, leading to a transformation of the status of the ethnographic encounters.

So, instead of being, from the classical ethnography perspective, observers and informants, respectively, anthropologists and biotechnology engineers should be pure dialogical interlocutors. And it is up to the anthropologist to make the transformation

from a complementary relationship to a symmetrical one, in order to ensure an effective communication between the different ecologies of practice. For the engineer, such symmetry will serve as a means for trust in the anthropologist's work, since she shall feel that, in a symmetrical relationship based on mutual understanding, there is no place for excessive critique. For the anthropologist, she will understand that such symmetry is fundamental as a milieu where different kinds of vocabulary have the opportunity to converge and, consequently, to be transduced in outsiders' discursiveness, thus opening up the hermetic alchemy-like lab to the wider social world. In the process, it is not the relative experiences of the encounter between interlocutors that count – it is their sense, as Paul Ricoeur (1976) has taught.

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