

**Thesis Project Portfolio**

**Co-culture assay method design to model antibody transport across the placenta**

**Fetal research and care ethics contribute to a different understanding of abortion**

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**Margaret E. Tomlin**

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Department of Biomedical Engineering

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## **Introduction**

Both my STS research and my Capstone project deal with fetuses and health of newborns, but that is essentially the extent of the connection between them. In my Capstone project I am designing an assay method to model the movement of antibodies from the mother to the fetus across the placenta. The broader intent of this project is to help inform mothers on when to receive the Tdap vaccine to ensure the baby has the most immunity from pertussis, or whooping cough, at the time of birth. On the other hand, my STS research considers the question of the ethics of abortion and fetal personhood. In that portion I address the issues concerning the ambiguity of assigning or not assigning personhood to fetuses and what actions should be taken because of this ambiguity. I look at these questions with insights that can be gained through knowledge of neonatal incubators and other neonatal technologies that save premature babies. I also consider the theory of Care Ethics and how that informs our ethical responsibilities to the mother and to the fetus in the case where the fetus can be assigned personhood.

## **Capstone Project**

Newborn children are susceptible to pertussis toxin, or whooping cough, because their immune systems have not fully developed at the time of birth. Because of this, pregnant women are recommended to get the Tdap vaccine during the third trimester of each pregnancy (1). Nonetheless, in-depth research in this area is limited and the possibility of premature birth is not considered in this metric. Research in this area, though, is difficult because the placenta is a highly species-specific organ. This means that animal testing methods, such as mouse models, are not a useful research method in relation to the placenta. As a step towards filling this gap in research, I am creating an in vitro – outside the organism – assay method that represents the placenta. I use this model to examine antibody transport across the placenta. To do this I use

inserts that have a small, semipermeable membrane that sit in the wells of a well plate, called a Transwell insert, and culture cells on either side of the membrane. This co-culture is necessary because the placenta has two main cell types that govern antibody transport, and looking at them together allows for a more accurate understanding of the system.

## **STS Research**

If there is one social dilemma that draws the most division, it would have to be abortion. No one can agree. Even people who are all ‘pro-choice’ or ‘pro-life’ do not agree with one another on the topic, let alone people on opposite sides of the debate. Are fetuses humans; if not, at what point do they become human; if they are, whose life is more valuable: the mother’s or the baby’s? These questions plague the debate and draw lines in the sand. In the following pages, I hope to draw a line in stone. The implications of technology such as the neonatal incubator and how it intersects with changing ideas on abortion will be investigated. This will be coupled with the Theory of Care Ethics – a classically feminist theory – to raise the question to an ethical framework. In summary, the question that the following pages are intended to answer is thus: how does considering abortion through technology that saves premature newborns influence views on abortion, and how can care ethics contribute to this understanding? In the end, the answer should show there exists a ‘relationship of care’ – the relationships Care Ethics is based on – between the doctor and the mother, yes, but especially between the mother and the fetus as well as the doctor and the fetus. Additionally, the mother-fetus and doctor-fetus relationships have such large gaps of dependence and vulnerability that it implies the responsibilities of the doctor and mother to the fetus are heightened.

## **Benefits of Working on These Projects Simultaneously**

By working on these two projects together I was able to better appreciate the importance of both the goal of the technical work and the importance of the ethical question in the STS research. While working with the cells and Transwell inserts, it was easy to lose sight of why what I was doing mattered. By working on the STS research at the same time, I was able to remember that the work I was doing could help vulnerable lives. The importance of the ethics was also made more obvious to me by working on the projects simultaneously. It was easy for me to see how researchers and scientists, including myself, could forget that they were dealing with vulnerable lives when working on fetal research by getting lost in the data.

## References

1. Centers for Disease Control and Prevention. (2022, December 1). Vaccinate pregnant patients to protect against pertussis. Centers for Disease Control and Prevention. <https://www.cdc.gov/pertussis/pregnant/hcp/pregnant-patients.html#:~:text=Vaccinating%20Pregnant%20Patients&text=Women%20should%20receive%20a%20dose,gestational%20weeks%2027%20through%2036>.