



# Research Week 2023

## Fetal sex determination test of Rhesus Macaques at gestational day 30

Kievit Lab, Hennebold Lab, Roberts Lab, Cardiometabolic Health at Oregon National Primate Research Center

### Keywords

Fetal sex determination, Reproductive Health, Non-human Primates, Rhesus Macaques, qPCR, SRY, *DYS14*, cfDNA

### Abstract

#### Background:

Fetal sex determination (FSD) is a cell-free DNA (cfDNA) screening assay that determines the presence of sex-linked fetal malformations using maternal serum or plasma. FSD from human samples is a valuable procedure in the field of reproductive health. Non-human primates (NHPs) are useful animal models for studying fetal development due to a number of reproductive similarities and progression of gestational events akin to humans.

#### Methods:

Based on original research conducted by the Yasmin lab and with a protocol created by the Hennebold lab, this test is typically conducted at gestational day (G) 90 (late first-trimester). In NHP research, FSD tests are used to determine which treatment groups a maternal subject may be assigned to in order to achieve an even distribution of offspring sex. Within the Kievit lab, FSD is being conducted at G30 (mid-first trimester). To our knowledge, this is the earliest gestational time point for which this methodology has been used. Within our procedure, 18S ribosomal DNA alongside the Y chromosomal sequences *SRY* and *DYS14* are assayed to determine both the relative quantity of autosomal cfDNA and the expression of male-specific fetal cfDNA.

#### Results:

Positive detection of autosomal and male-specific cfDNA has been established by the Kievit lab. Thus far, five total pregnancies have been assayed. Of these, two pregnancies have shown positive expression of Y chromosomal sequences, while the remaining three presented no expression. Results will be confirmed in late-April 2023 through fetal morphology by veterinary staff at G145. Once these fetal sexes have been confirmed, a decisive success rate can be calculated for this procedure.

#### Conclusions:

Due to the positive detection of autosomal and male-specific cfDNA, it has tentatively been concluded that fetal sex can be determined at G30. This result allows maternal dams to be separated into the uniform treatment groups for reproductive studies.