**Some Current Reproductive Technologies**

**1. Selective Breeding**

* The most commonly used reproductive technique is selective breeding.
* Two plants or two animals of one species that have desired traits are bred with each other.
* The breeder then selects the offspring that have the desired traits and uses those to breed the next generation.
* After several generations of selection, all the offspring will have the desired traits.

**2. Artificial Vegetative Reproduction**

* When a plant has desirable traits, growers can take cuttings from it and grow new plants from the cuttings using vegetative reproduction.
* There is a limited number of cuttings that can be taken from a plant.
* Scientists have developed a quicker way to produce plant clones. That is not limited in number like cuttings:
  + They remove individual cells from a desirable plant.
  + Place the cells in Petri dishes that contain nutrients and growth hormones
  + Once the seedlings have grown roots, they are planted in soil.
* Another technique is grafting, which is commonly used for fruit trees.
  + Grafting involves attaching a branch from a desirable tree onto the trunk of another tree
  + The bark of the grafted branch will fuse with the bark of the root tree.
  + Then the branch will grow and eventually produce fruit.
  + Grafting allows growers to turn one good tree into thousands of copies.

**3. Hatcheries**

* Wild salmon use external fertilization, where relatively few eggs are actually fertilized.
* Just before they are ready to reproduce, male and female fish are caught.
* The eggs and sperm are collected and mixed together in a container.
* The fertilized eggs are incubated in special trays
* Once the eggs hatch, the young are fed at the hatchery before they are released into the wild.
* This process produces a much greater number of young salmon than would occur naturally.

**4. Recombinant DNA**

* Recombinant DNA technology involves combining genes from different individuals or different species into a single molecule of DNA.
* Biotechnology companies use this technology to produce certain characteristics in organisms or to produce substances from organisms.
* For example:
  + DNA that makes a cell produce a certain hormone would be introduced into bacteria DNA.
  + The bacteria will replicate many times over and the scientist will now have a population of bacteria that all produce the desired hormone.
  + The hormone would then be extracted and used for its intended purpose.

**5. Fertility Drugs**

* Fertility drugs stimulate the production of hormones that affect the action of the female’s follicles.
* When a woman takes these drugs, more eggs mature and are released from the ovary.
* Taking fertility drugs will often results in multiple births (twins, triplets).

**6. Artificial Insemination**

* Artificial insemination involves introducing sperm into the reproductive tract of the female by a method other than sexual intercourse.
* One cause of infertility can be a low sperm count. So if the male has a low sperm count, his sperm can be collected over time and then artificially inserted into the female by a doctor.

**7. Intrauterine Insemination**

* Intrauterine insemination is similar to artificial insemination.
* The sperm is placed directly into the female’s uterus, rather than into the vagina, as in artificial insemination.
* The sperm is placed high up in the uterus at the time of ovulation.
* This technology ensures that as many sperm as possible reach the egg.

**8. Gamete Intrafallopian Transfer**

* In gamete intrafallopian transfer (GIFT) the female’s eggs are removed from the ovary and reinserted into the oviduct along with the male’s sperm.
* This increases the chances of fertilization by bringing the egg and the sperm together in the oviduct, where fertilization normally occurs.

**9. In Vitro Fertilization**

* In vitro fertilization (IVF) means that fertilization takes place outside the female’s body in a Petri dish in a laboratory.
* In vitro means “in glass”.
* Follicles containing immature eggs are removed from the female’s ovaries.
* Once the eggs have matured, sperm cells from the father are added.
* After a few days, the embryos are inserted into the uterus at the right time of the menstrual cycle.
* The embryos may also be implanted in a female who is not the biological mother if there is some reason why the mother’s uterus cannot accept the embryos.
  + The female who carries the embryos is called the surrogate mother.

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**10. Intracytoplasmic Sperm Injection**

* Intracytoplasmic sperm injection (ICSI) involves injecting a single sperm into the cytoplasm of a mature healthy egg.
* This technology is used when normal IVF has not been successful.
* The sperm count may be extremely low, or the sperm may be structurally unable to swim properly to reach the egg.