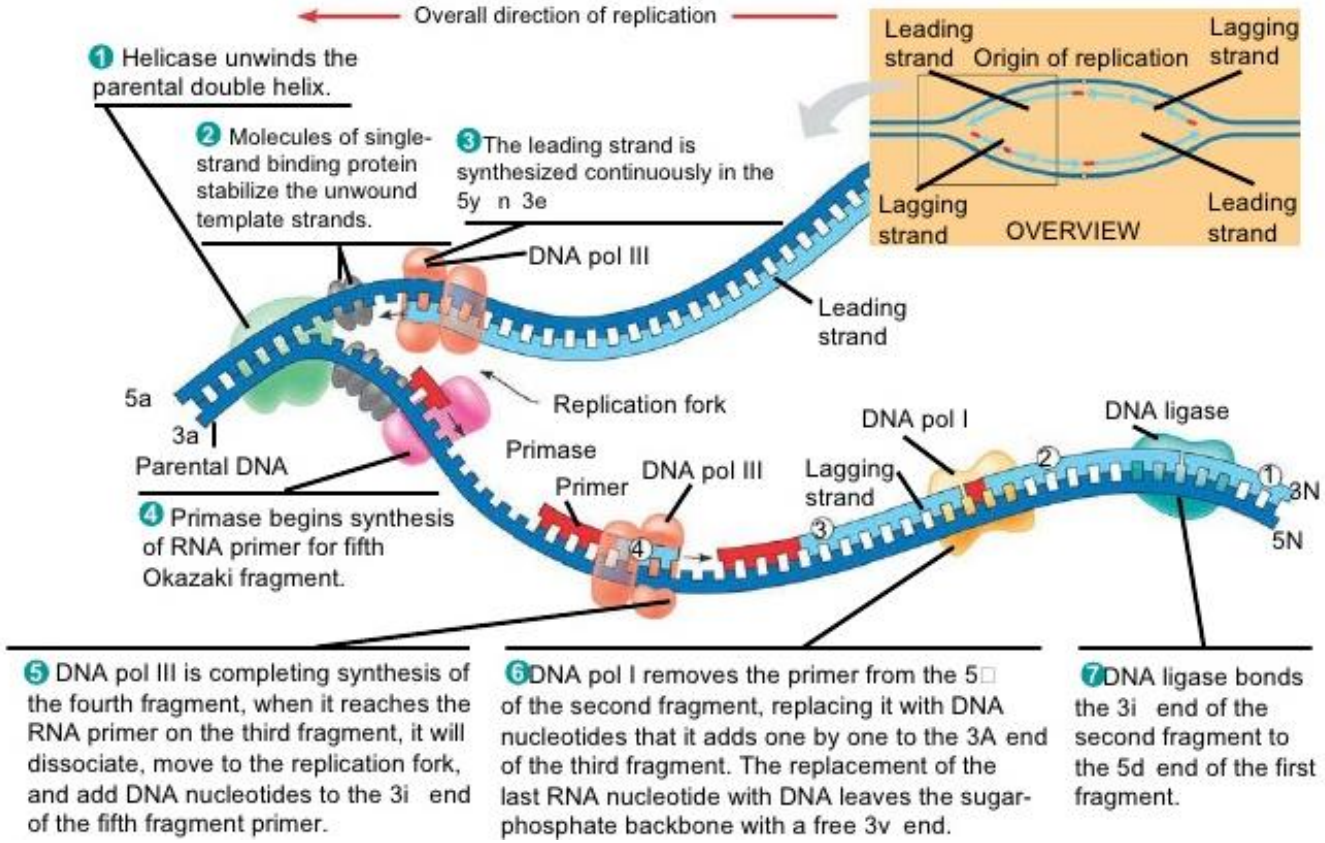
BEHAVIORAL ECOLOGY- Inheritance of Behaviour

Species and Dilemma	Hypothesis	Experimental method	Results	Conclusion
Siberian Jays: Have well hidden nests but visiting the nest with food for young ones can give their location to the predators so they should visit their nests less when predators are around. Dilemma: Jays face the dilemma that reducing predation risk can increase starvation risk. High feeding rate will help offspring grow big well increasing the risk of being spotted by predator, Low feeding rate decreases predation risk but leads to starvation.	Jays feed their nestlings early in the morning to avoid predators.	Eggers: 1.Observation: Compared the rate of feeding (no. of nest visits per hour) in areas with and without predators. 2. Experiment in areas with no predators: Two conditions compared: (a)Raven (predator) playbacks to mimic predator activity (b) no playbacks.	Observation: Areas with predators Greatest rate of feeding very early morning (3-6am before the predators became active) No predators: No difference in the rate of feeding throughout the day. Experiment: Playbacks Greatest rate of feeding very early morning. No playbacks No difference in the rate of feeding throughout the day.	Jays make decisions about when to feed the nestlings to reduce the predation risk. Reducing predation risk (low feeding rate) can increase starvation risk and vice versa. Hence, an intermediate rate of feeding would be the best. 1 plot and happy medium plot
Crabs: Dilemma: Small mussels required less energy and time investment to break open (high chances of success) but had little energy content. Many small mussels should be collected to satisfy energy demand increasing predation risk. Larger mussels required more energy and time investment to break open (low chances of success) increasing predation risk but had good amount of energy content. Few large mussel is enough to satisfy energy demand.	Crabs select the optimum size of mussels to prey upon.	Optimality Calculation Observation of crabs selecting mussel size and calculation of the profitability of mussels selected. Profitability = Energy content/ Time taken to break the mussel open to eat	Great variation in the no. of individuals that either choose many small or few large mussels. Majority choose an intermediate optimum mussel size for maximum profitability.	Crabs make decision while choosing mussel size and majority of individuals select intermediate optimum mussel size for maximum profitability.

- # A summary of DNA replication



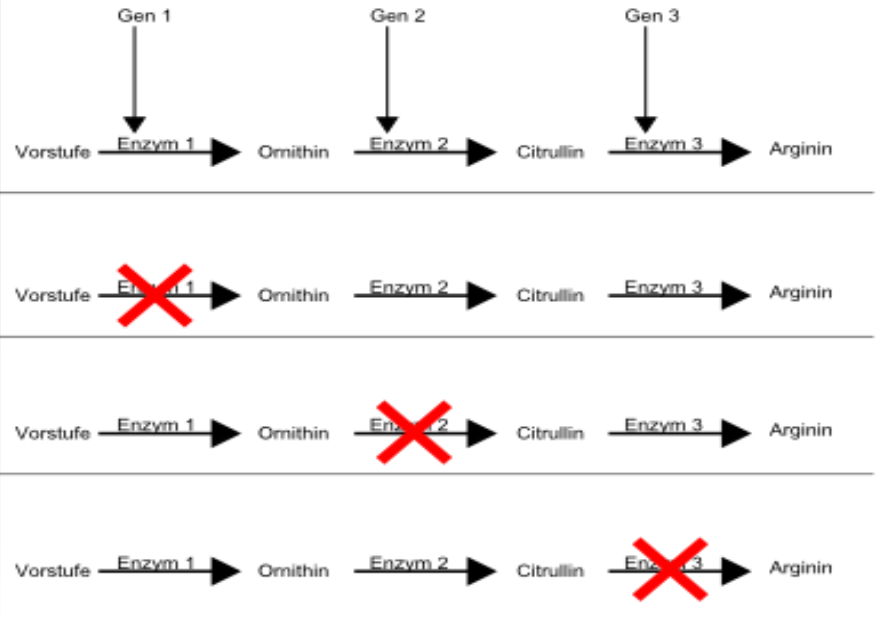
5 DNA pol III is completing synthesis of the fourth fragment, when it reaches the RNA primer on the third fragment, it will dissociate, move to the replication fork, and add DNA nucleotides to the 3i end of the fifth fragment primer.

6 DNA pol I removes the primer from the 5□ of the second fragment, replacing it with DNA nucleotides that it adds one by one to the 3A end of the third fragment. The replacement of the last RNA nucleotide with DNA leaves the sugar-phosphate backbone with a free 3v end.

7 DNA ligase bonds the 3i end of the second fragment to the 5d end of the first fragment.

Beadle & Tatum Experiment:

	Minimalmedium (MM)	MM + Ornithin	MM + Citrullin	MM + Arginin
Wildtyp	✓	✓	✓	✓
Klasse I Mutanten (Mutation im Gen 1)	✗	✓	✓	✓
Klasse II Mutanten (Mutation im Gen 2)	✗	✗	✓	✓
Klasse III Mutanten (Mutation im Gen 3)	✗	✗	✗	✓



1.) Bread mould fungus *Neurospora* bombarded with X-rays to form mutants that differed in their nutritional requirements.
2.) Wild-type can survive on Minimal medium (sugars and inorganic ions) as it is prototrophic and can synthesize all required organic molecules for growth. Mutants could not survive as they could not synthesize essential molecules from minimal ingredients.
3.) All mutants could grow and survive on Complete growth medium (MM + 20 AA + nutrients).
4.) All those defective in arginine biochemical pathway were collected. Mutants were allowed to grow on medium with MM + one additional nutrient of arginine pathway.

This defect included mutation in 3 different genes that block the pathway at different steps due to lack of enzyme at that particular step. **One gene, One Enzyme** hypothesis.

Genetic Disorders

Autosomal Recessive	Sex-linked Disorders	Autosomal Dominant
*Cystic Fibrosis: Pleiotropy- single gene responsible for many char. of org.	Haemophilia: Absence of proteins reqd. for blood clotting	Achondroplastic dwarfism
Phenylketonuria: Phenylalanine hydroxylase not produces to metabolize phenylalanine converted to phenyl pyruvic acid and its accumulation.	Colour blindness:	Huntington's disease: Late onset after 45 years Deteoration of nervous system leads to motor disturbances Psychological disturbances
Albinism: Block in the phenylketonuria pathway due to which pigment melanin is not produced.	Muscular dystrophy: Progressive weakening of muscles (absence of key muscle protein dystrophin)	
Beta thalassemia: Reduced production of beta chain of haemoglobin caused due to mutations at 8 different positions on same gene as sickled mutation.	Fragile X- syndrome	
Sickle cell anaemia: Some cells are sickle shaped, Oxygen molecules cannot bind to that cell as biconcave shape is missing. They accumulate clogging arteries leading to serious conditions.		
Tay Sachs disease: Brain cannot metabolize certain lipids because a crucial enzyme does not work. Lipids accumulate in brain cells, child suffers seizures, blindness, and degeneration of mental and motor performance causing death within a few years.		*Cl- ions are not transported from extracellular fluid in to cells due to gene defect, accumulation causes thick sticky coating of mucus around certain cells of pancreas, lungs, GIT- poor absorption, chronic bronchitis, bacterial infections.

Inheritance Pattern of genetic disorders

Autosomal Recessive	Sex-linked Disorders	Autosomal Dominant
Generations are skipped	Generations are skipped	Generations never skipped
Males & females affected equally	Occur entirely and primarily in males	Males & females affected equally
Consanguineous marriages expose harmful recessive alleles.	Passed from mother to son	