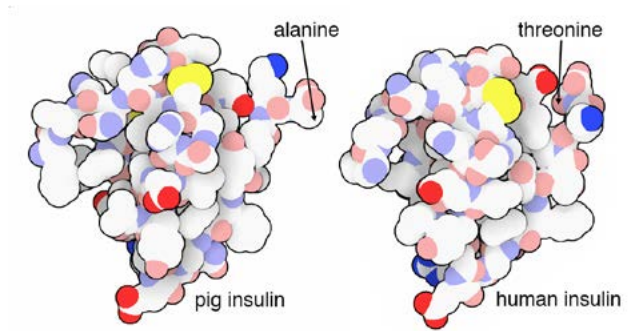


Insulin for Diabetic People

Insulin is a small signaling protein that helps to keep blood sugar levels steady. The insulin gene contains the instructions for making insulin protein.

In people with Type 1 diabetes, the specialized cells in the body that make insulin are damaged; they cannot make insulin. Without insulin, a diabetic person's blood sugar levels can become dangerously high or low. To keep their blood sugar steady, they need to take insulin as a medication.

The first insulin medication was made from insulin that was isolated from the pancreas glands of pigs or cattle that had been butchered for their meat. Newer insulin medication is made by putting the human insulin gene into bacteria or yeast cells. The cells make insulin protein, which is then purified and given to diabetic people.



Insulin protein molecules from pig and human.

Image from David Goodsell,
doi:10.2210/rcsb_pdb/mom_2001_2

Observations

1. In humans, insulin is produced only by specialized cells in the pancreas gland.
2. The only organisms that have pancreas glands that naturally make insulin are vertebrates.
3. Though pork chops and steak are much more popular foods, some people enjoy eating the pancreas glands from animals—a delicacy that some cultures call “sweetbreads.”
4. Some diabetic people had allergic reactions to insulin medication that had been isolated from pigs or cows. Their immune systems recognized the insulin as foreign and attacked it.
5. The amino acid sequence of insulin varies among species. The human insulin protein is made up of 51 amino acids. Insulin from pigs is 98% identical to human, and insulin from cows is 94% identical.
6. All living things read information in genes the same way.

Question

Which is a better medication for diabetic people: insulin isolated from pigs or cows, or insulin made by inserting the human insulin gene into bacteria or yeast cells?

Argument A

Insulin that is made by inserting the human insulin gene into bacteria or yeast cells is a better medication for diabetic people than insulin isolated from pigs or cows. The insulin from both pigs and cows has a different amino acid sequence than human insulin, and it triggered an allergic reaction in some patients. Since all living things read information in genes the same way, the bacteria or yeast should make insulin from the human gene the same way cells in the pancreas do. Because this insulin will have the same amino acid sequence as natural human insulin, the diabetic person’s immune system will be less likely to recognize it as foreign. Insulin that is less likely to trigger an allergic reaction is a better medication.

Argumentation Checklist

Yes	No	CLAIM	NOTES
<input type="checkbox"/>	<input type="checkbox"/>	Is there a clearly stated claim?	
<input type="checkbox"/>	<input type="checkbox"/>	Is it consistent with all of the available evidence?	
<input type="checkbox"/>	<input type="checkbox"/>	Is it the simplest conclusion based on all of the available evidence?	
EVIDENCE			
<input type="checkbox"/>	<input type="checkbox"/>	Is there enough evidence to support the claim?	
<input type="checkbox"/>	<input type="checkbox"/>	Is all of the evidence relevant to the claim (there are no extra facts)?	
<input type="checkbox"/>	<input type="checkbox"/>	Do the data collection, analysis, and interpretation seem reasonable?	
REASONING			
<input type="checkbox"/>	<input type="checkbox"/>	Is there enough reasoning to justify why the evidence supports the claim?	
<input type="checkbox"/>	<input type="checkbox"/>	Is the reasoning related to the claim?	
<input type="checkbox"/>	<input type="checkbox"/>	Is it related to the evidence?	
<input type="checkbox"/>	<input type="checkbox"/>	Is it consistent with accepted science ideas?	
<input type="checkbox"/>	<input type="checkbox"/>	Does it use facts, not feelings (system 2 thinking, not system 1)?	

Argument B

Insulin isolated from pigs or cows is a better medication for diabetic people than insulin made in bacteria or yeast cells. Single-celled bacteria and yeast do not have pancreas glands, and they do not normally make insulin. Pigs and cows are vertebrates, and their pancreas glands naturally make insulin. Insulin from pigs or cows is more natural than insulin made from yeast or bacteria. Since natural products are better than synthetic ones, insulin from pigs or cows would be a better medication for diabetic people. We also already eat cows and pigs, and it would be better to not waste the natural products that could be made from the parts people don't usually eat and would otherwise throw away.

Argumentation Checklist

Yes	No	CLAIM	NOTES
<input type="checkbox"/>	<input type="checkbox"/>	Is there a clearly stated claim?	
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EVIDENCE			
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