
REVOLVE COMICS
TYPE 1
VOL. 2
ATTACK OF THE KETONES

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TYPE 1 VOL. 2

ATTACK OF THE KETONES

So here it is, the next chapter of our Type 1 saga...

For those of you who have read Type 1: Origins (if not...why not?), you may recall it was where Gary was diagnosed and we followed his early experiences of living with type 1 diabetes. Critically, he also learned that he was not alone. With type 1 diabetes, the learning never stops.

In the movie 'Iron Man', there was the moment when Tony Stark found himself on the brink of disaster when shrapnel threatened to damage his heart. Medical intervention took him out of that predicament. Later on, a key new piece of him, the arc reactor, was taken away from him without permission. Without this, life would be over. Despite the challenge, he found the inner strength to replace what was missing. The rest is movie history. In type 1 diabetes, the ability to produce insulin has also been taken away without permission. Thankfully, what is missing can be replaced. Even so, the human body is not a perfect machine and things do not always go to plan. This is despite the best efforts to administer insulin regularly, at the right dose and at the right time.

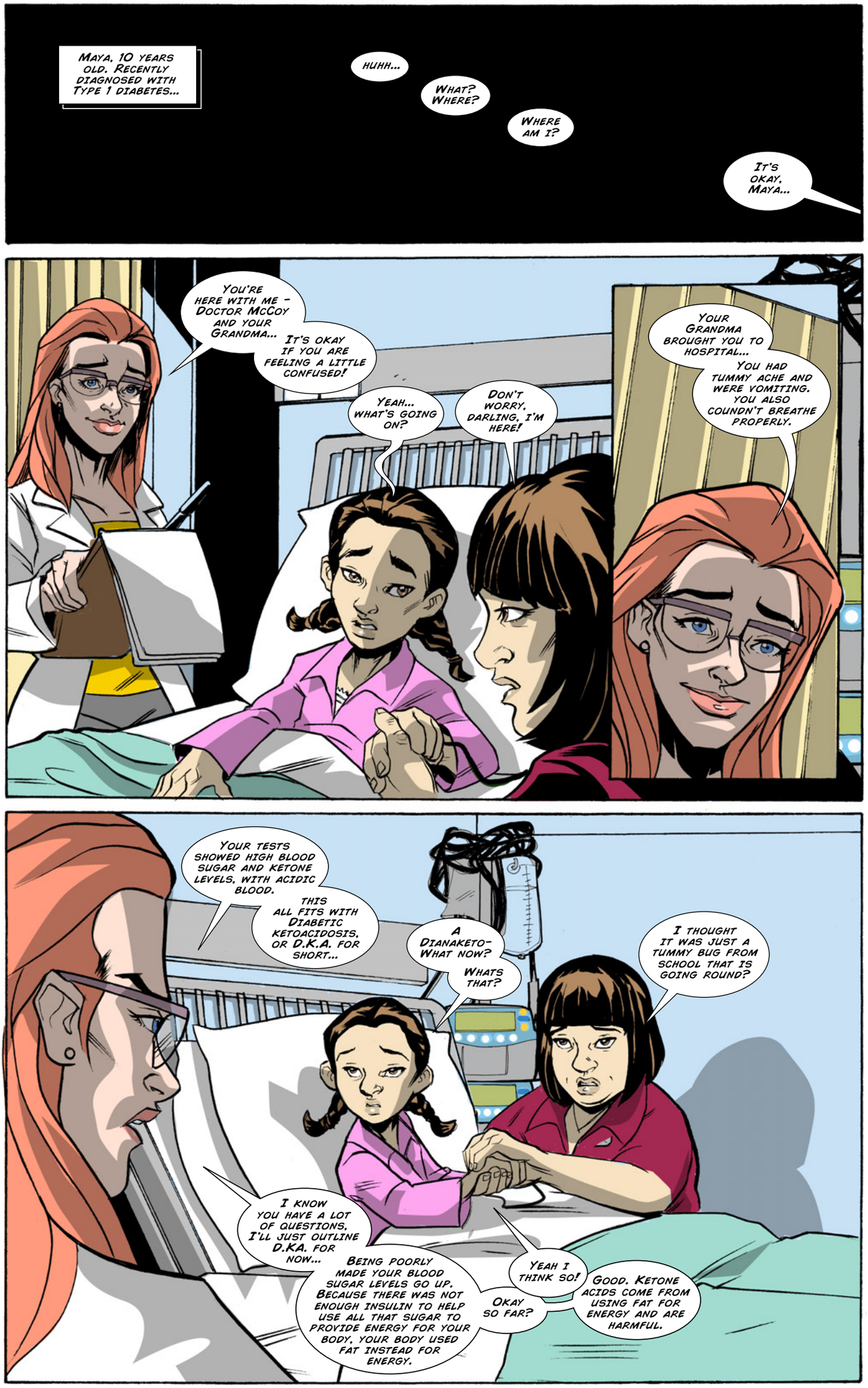
The modern world is a hectic place and fitting into that, with or without type 1 diabetes, can be challenging for anyone. The key thing to remember in type 1 diabetes is that at times of particular stress, one must keep monitoring and not lose sight of that climbing glucose level. It could be the first sign of potential impending problems, as explored here in our latest type 1 diabetes adventure!

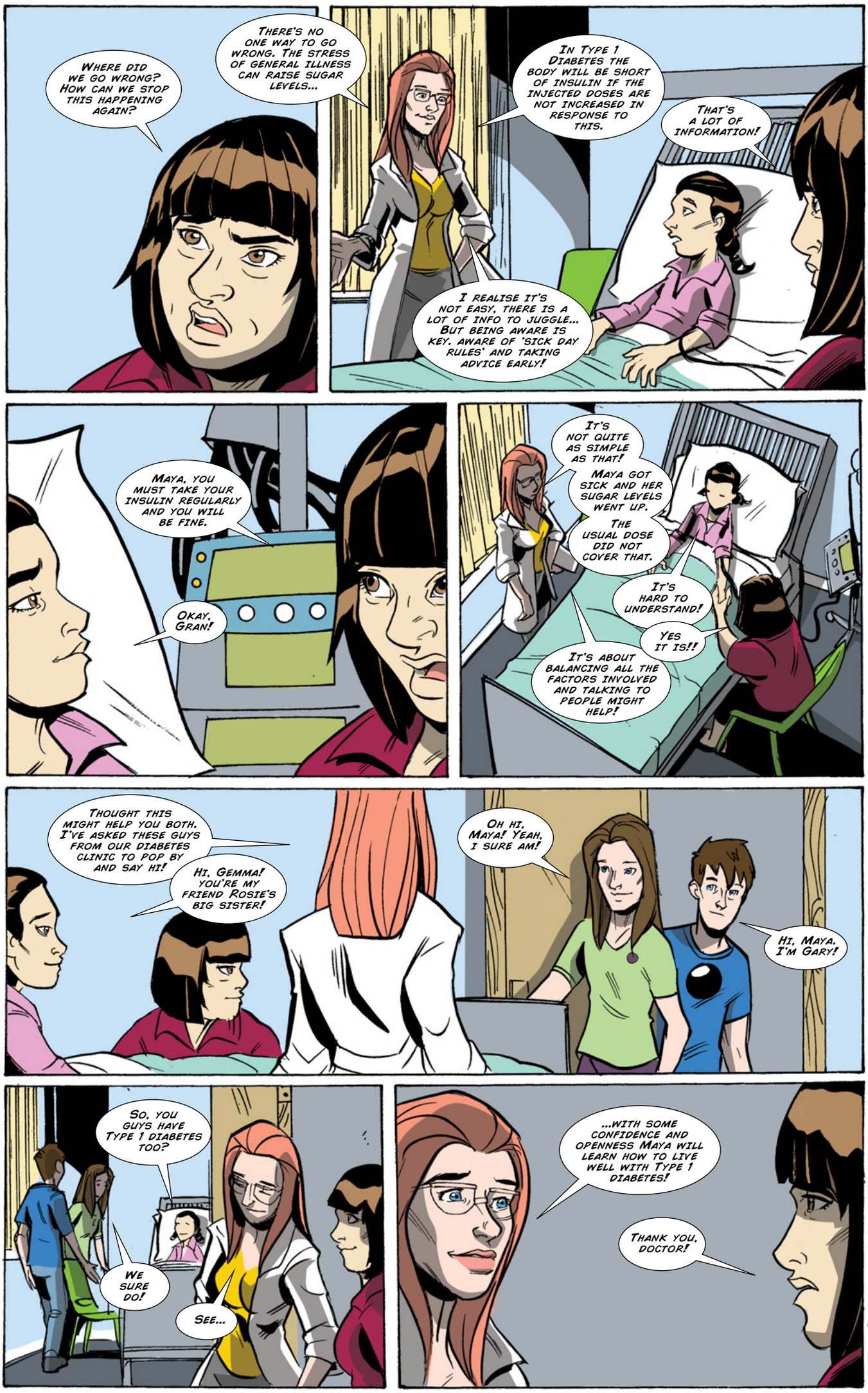
And a special thank you for the help and support of **Portsmouth Hospitals NHS Trust** and **University Hospital Southampton NHS Foundation trust, NHS England** and **Simon Enright.**

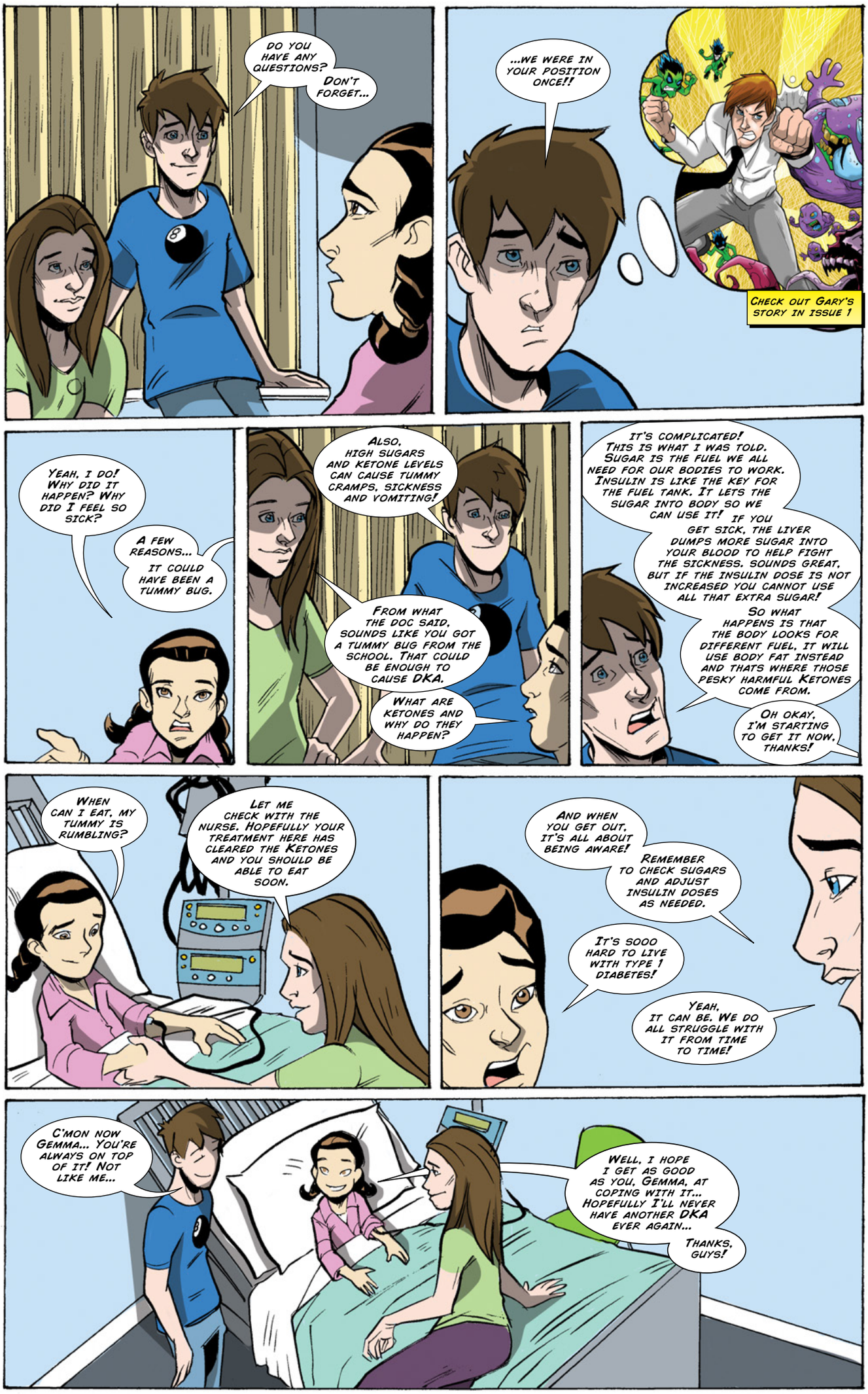
We hope you enjoy!

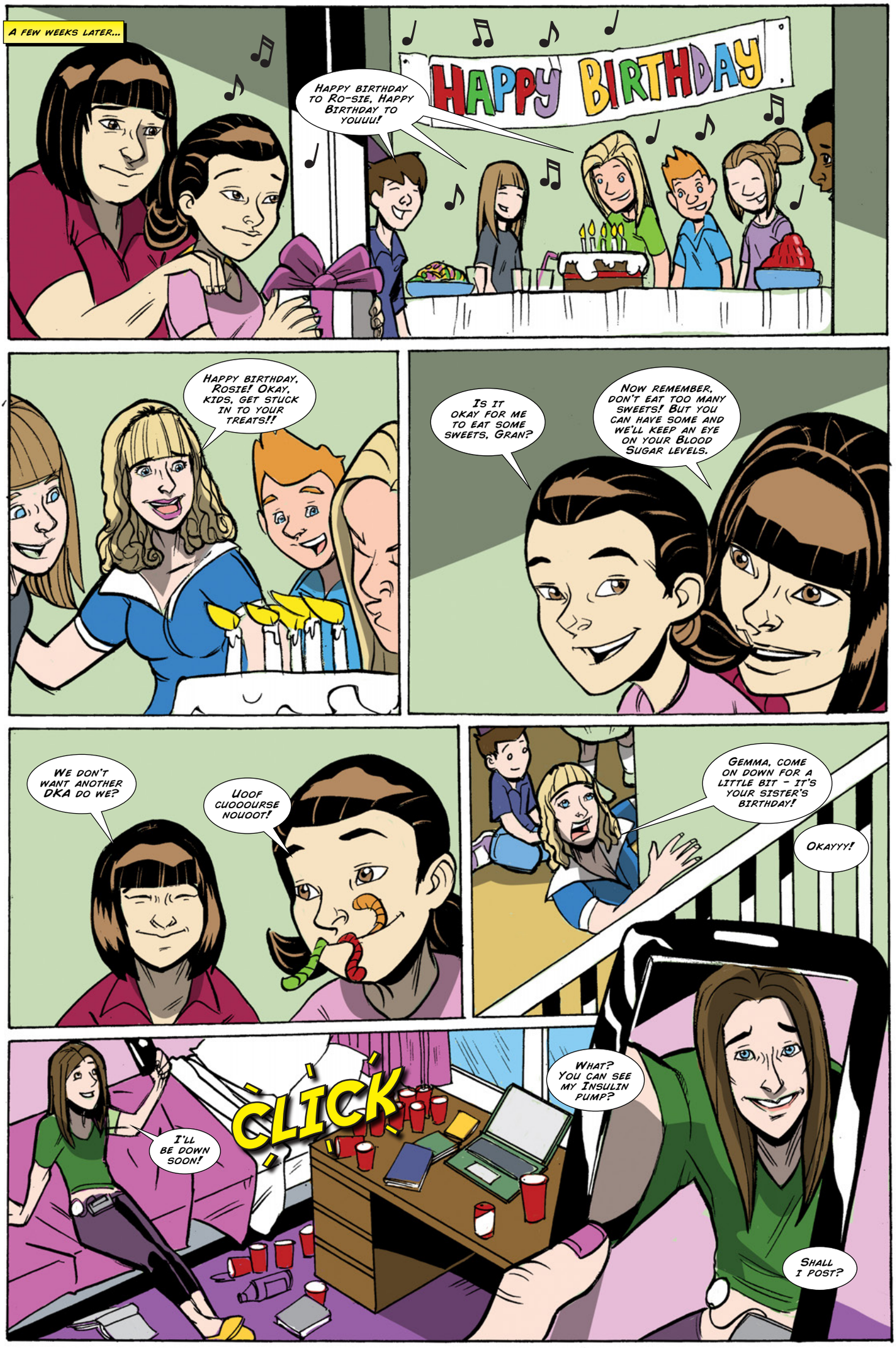
Partha and Mayank

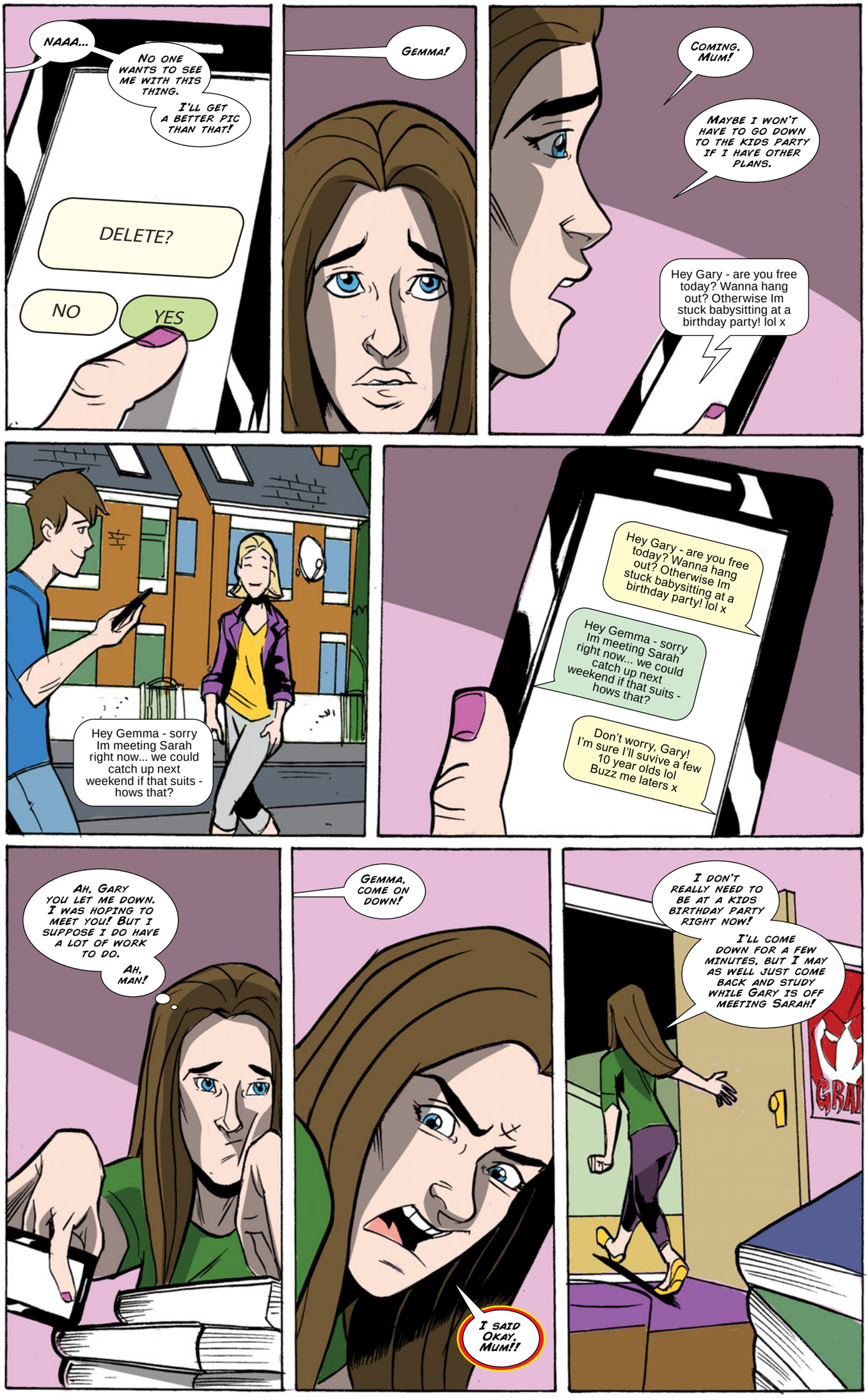

This town is sick...
...it smells sick!
Am I the only one that sees what's coming?
Detective Shoolin?
Detective Ian Shoolin?
We need you over here to examine the crime scene, sir...
And who might you be?
I'm Lieutenant Diana Betes, sir! I've been assigned as your partner on this case and to examine the scene!
Firstly...
...I don't do partners... I only work alone!
Secondly...
I don't need to examine the crime scene...
I already know what's coming...
And what's that?
...a Crimewave!


Maya, 10 years old. Recently diagnosed with Type 1 diabetes...
huhh...
What? Where?
Where am I?
It's okay, Maya...
You're here with me - Doctor McCoy and your Grandma...
It's okay if you are feeling a little confused!
Yeah... what's going on?
Don't worry, darling, I'm here!
Your Grandma brought you to hospital...
You had tummy ache and were vomiting. You also coundn't breathe properly.
Your tests showed high blood sugar and ketone levels, with acidic blood.
This all fits with Diabetic ketoacidosis, or D.K.A. for short...
A Dianaketo- What now?
Whats that?
I thought it was just a tummy bug from school that is going round?
I know you have a lot of questions, I'll just outline D.KA. for now...
Being poorly made your blood sugar levels go up. Because there was not enough insulin to help use all that sugar to provide energy for your body, your body used fat instead for energy.
Okay so far?
Yeah I think so!
Good. Ketone acids come from using fat for energy and are harmful.

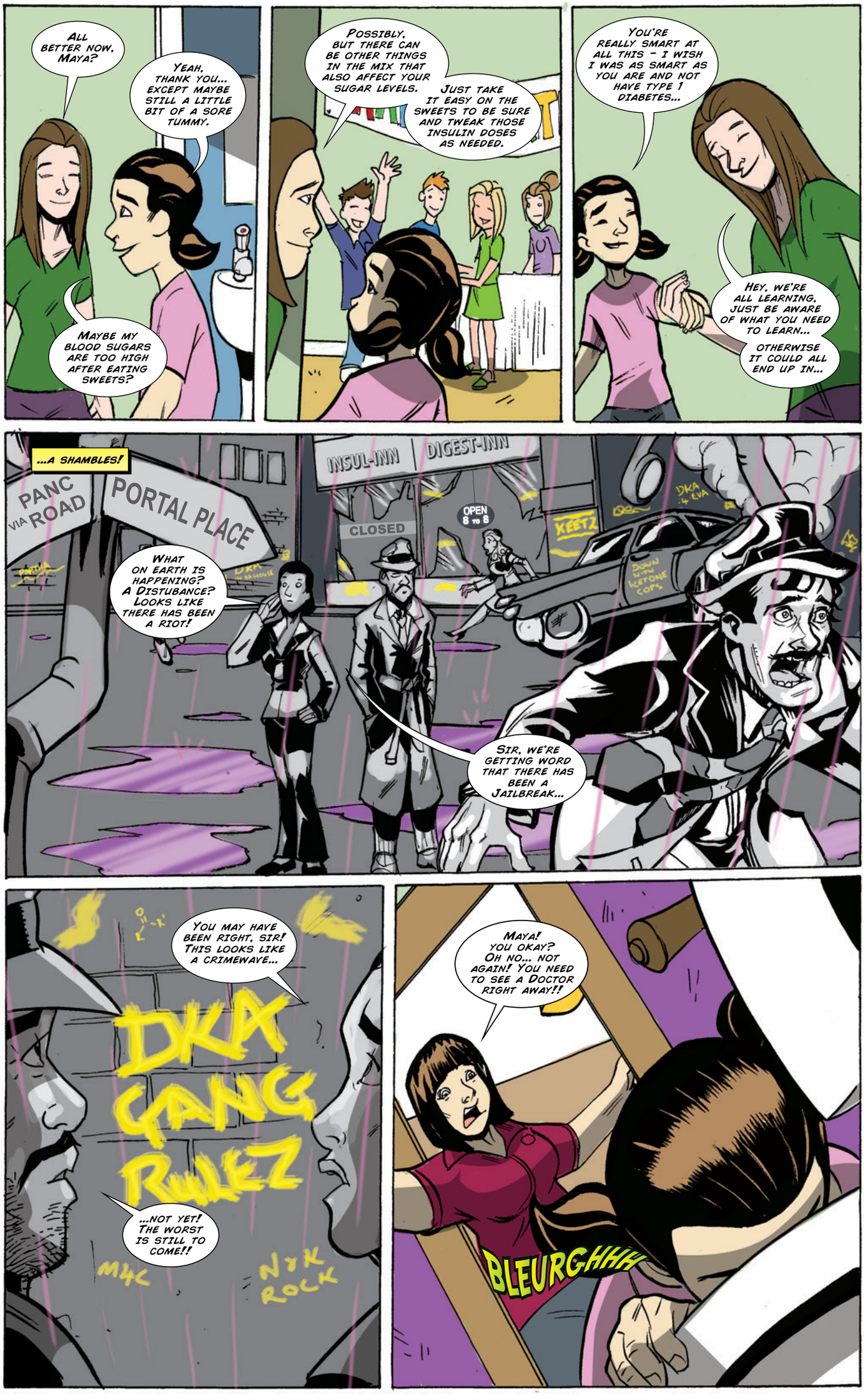

Where did we go wrong? How can we stop this happening again?
There's no one way to go wrong. The stress of general illness can raise sugar levels...
In Type 1 Diabetes the body will be short of insulin if the injected doses are not increased in response to this.
That's a lot of information!
I realise it's not easy, there is a lot of info to juggle... But being aware is key. aware of 'sick day rules' and taking advice early!
Maya, you must take your insulin regularly and you will be fine.
Okay, Gran!
It's not quite as simple as that!
Maya got sick and her sugar levels went up.
The usual dose did not cover that.
It's hard to understand!
Yes it is!!
It's about balancing all the factors involved and talking to people might help!
Thought this might help you both. I've asked these guys from our diabetes clinic to pop by and say hi!
Hi, Gemma! you're my friend Rosie's big sister!
Oh hi, Maya! Yeah, I sure am!
Hi, Maya. I'm Gary!
So, you guys have Type 1 diabetes too?
We sure do!
See...
...with some confidence and openness Maya will learn how to live well with Type 1 diabetes!
Thank you, doctor!

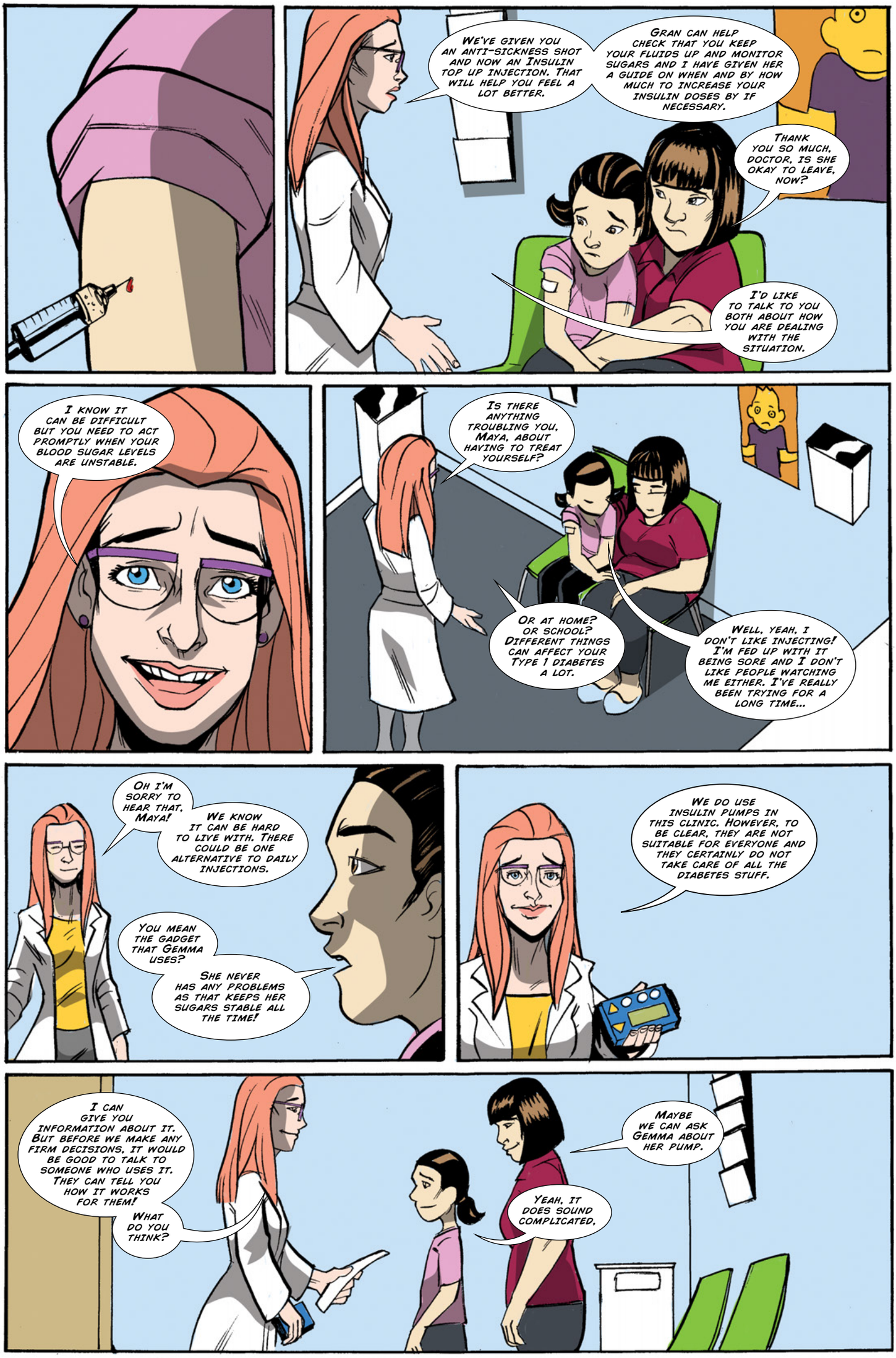

DO YOU HAVE ANY QUESTIONS?
DON'T FORGET...
...WE WERE IN YOUR POSITION ONCE!!
CHECK OUT GARY'S STORY IN ISSUE 1
YEAH, I DO! WHY DID IT HAPPEN? WHY DID I FEEL SO SICK?
A FEW REASONS...
IT COULD HAVE BEEN A TUMMY BUG.
ALSO, HIGH SUGARS AND KETONE LEVELS CAN CAUSE TUMMY CRAMPS, SICKNESS AND VOMITING!
FROM WHAT THE DOC SAID, SOUNDS LIKE YOU GOT A TUMMY BUG FROM THE SCHOOL. THAT COULD BE ENOUGH TO CAUSE DKA.
WHAT ARE KETONES AND WHY DO THEY HAPPEN?
IT'S COMPLICATED! THIS IS WHAT I WAS TOLD. SUGAR IS THE FUEL WE ALL NEED FOR OUR BODIES TO WORK. INSULIN IS LIKE THE KEY FOR THE FUEL TANK. IT LETS THE SUGAR INTO BODY SO WE CAN USE IT!
IF YOU GET SICK, THE LIVER DUMPS MORE SUGAR INTO YOUR BLOOD TO HELP FIGHT THE SICKNESS. SOUNDS GREAT, BUT IF THE INSULIN DOSE IS NOT INCREASED YOU CANNOT USE ALL THAT EXTRA SUGAR!
SO WHAT HAPPENS IS THAT THE BODY LOOKS FOR DIFFERENT FUEL, IT WILL USE BODY FAT INSTEAD AND THATS WHERE THOSE PESKY HARMFUL KETONES COME FROM.
OH OKAY, I'M STARTING TO GET IT NOW, THANKS!
WHEN CAN I EAT, MY TUMMY IS RUMBLING?
LET ME CHECK WITH THE NURSE. HOPEFULLY YOUR TREATMENT HERE HAS CLEARED THE KETONES AND YOU SHOULD BE ABLE TO EAT SOON.
AND WHEN YOU GET OUT, IT'S ALL ABOUT BEING AWARE!
REMEMBER TO CHECK SUGARS AND ADJUST INSULIN DOSES AS NEEDED.
IT'S SOOO HARD TO LIVE WITH TYPE 1 DIABETES!
YEAH, IT CAN BE. WE DO ALL STRUGGLE WITH IT FROM TIME TO TIME!
C'MON NOW GEMMA... YOU'RE ALWAYS ON TOP OF IT! NOT LIKE ME...
WELL, I HOPE I GET AS GOOD AS YOU, GEMMA, AT COPING WITH IT... HOPEFULLY I'LL NEVER HAVE ANOTHER DKA EVER AGAIN...
THANKS, GUYS!


A few weeks later...
HAPPY BIRTHDAY
Happy birthday to Ro-sie, Happy Birthday to youuu!
Happy birthday, Rosie! Okay, kids, get stuck in to your treats!!
Is it okay for me to eat some sweets, Gran?
Now remember, don't eat too many sweets! But you can have some and we'll keep an eye on your Blood Sugar levels.
We don't want another DKA do we?
Uoof cuoooourse nouoot!
Gemma, come on down for a little bit - it's your sister's birthday!
Okayyy!
CLICK
I'll be down soon!
What? You can see my Insulin pump?
Shall I post?


NAAA...
No one wants to see me with this thing.
I'll get a better pic than that!
DELETE?
NO
YES
Gemma!
Coming, Mum!
Maybe I won't have to go down to the kids party if I have other plans.
Hey Gary - are you free today? Wanna hang out? Otherwise Im stuck babysitting at a birthday party! lol x
Hey Gemma - sorry Im meeting Sarah right now... we could catch up next weekend if that suits - hows that?
Hey Gary - are you free today? Wanna hang out? Otherwise Im stuck babysitting at a birthday party! lol x
Hey Gemma - sorry Im meeting Sarah right now... we could catch up next weekend if that suits - hows that?
Don't worry, Gary! I'm sure I'll suvive a few 10 year olds lol Buzz me laters x
Ah, Gary you let me down. I was hoping to meet you! But I suppose I do have a lot of work to do.
Ah, man!
Gemma, come on down!
I said Okay, Mum!!
I don't really need to be at a kids birthday party right now!
I'll come down for a few minutes, but I may as well just come back and study while Gary is off meeting Sarah!


Calling All Cars! A disturbance has broken out on the east side of town. Please respond!
Sounds like the beginnings of a crimewave to me!
iiiWiiiiooiWiiiiuuoo
Let's go!
VROOMM
Gran, I've got tummy ache and feel sick!
Oh, Maya, I told you to not eat too many sweets! You remember what the Doctor said?
Don't worry, I'll take you to the bathroom!
Let your Gran rest. I have to go too but you can go first!
Thank you! You're a darling.
Thank you, Gemma!
Hang on- Isn't Maya Diabetic? Maybe she shouldn't be eating sweets at all?
It's not as simple as that...
Although Maya has type 1 diabetes, she is still okay to have some sweets.
Oh... Okay, sorry, I misunderstood!


All better now, Maya?
Yeah, thank you... except maybe still a little bit of a sore tummy.
Maybe my blood sugars are too high after eating sweets?
Possibly, but there can be other things in the mix that also affect your sugar levels.
Just take it easy on the sweets to be sure and tweak those insulin doses as needed.
You're really smart at all this - I wish I was as smart as you are and not have type 1 diabetes...
Hey, we're all learning, just be aware of what you need to learn...
otherwise it could all end up in...
...a shambles!
PANC VIA ROAD
PORTAL PLACE
INSUL-INN
DIGEST-INN
OPEN 8 TO 8
CLOSED
KEETZ
DKA 4 EVA
DOWN WITH KETONE COPS
What on earth is happening? A Distubance? Looks like there has been a riot!
Sir, we're getting word that there has been a Jailbreak...
You may have been right, sir! This looks like a crimewave...
DKA GANG RULEZ
...not yet! The worst is still to come!!
M4C
N4K ROCK
Maya! you okay? Oh no... not again! You need to see a Doctor right away!!
BLEURGHHH


We've given you an anti-sickness shot and now an Insulin top up injection. That will help you feel a lot better.
Gran can help check that you keep your fluids up and monitor sugars and I have given her a guide on when and by how much to increase your insulin doses by if necessary.
Thank you so much, doctor, is she okay to leave, now?
I'd like to talk to you both about how you are dealing with the situation.
I know it can be difficult but you need to act promptly when your blood sugar levels are unstable.
Is there anything troubling you, Maya, about having to treat yourself?
Or at home? or school? Different things can affect your Type 1 diabetes a lot.
Well, yeah, I don't like injecting! I'm fed up with it being sore and I don't like people watching me either. I've really been trying for a long time...
Oh I'm sorry to hear that, Maya!
We know it can be hard to live with. There could be one alternative to daily injections.
You mean the gadget that Gemma uses?
She never has any problems as that keeps her sugars stable all the time!
We do use insulin pumps in this clinic. However, to be clear, they are not suitable for everyone and they certainly do not take care of all the diabetes stuff.
I can give you information about it. But before we make any firm decisions, it would be good to talk to someone who uses it. They can tell you how it works for them!
What do you think?
Maybe we can ask Gemma about her pump.
Yeah, it does sound complicated.


Inside the adipose prison...
HSL
OFFLINE
INSULIN


Officer, are you okay? What happened here?
I'll be fine. Just a little dizzy, right now...
It was the "Adiposers". They broke the Holding Stasis Locks. Led by 'HIM'... he did it!
HIM? Who do you mean?


The leader...
I smell it...
stress..
glucose...
HSLs offline...
...it's time!!
...he led the prisoners...


We couldnt control them!! There weren't enough ketone cops...
They were sent off to stop other jailbreaks...


They rioted and over powered my squad of Ketone Cops. We got Insulin leaks everywhere!
now everything is in danger - they are going to bring down everything we know...

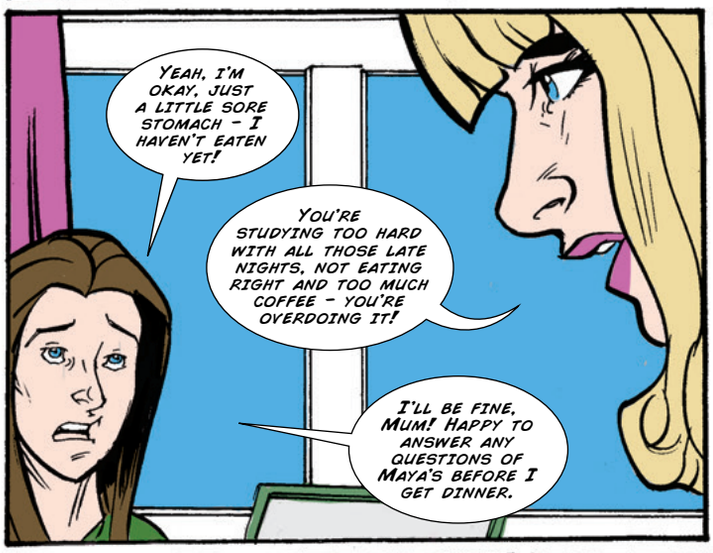

...They broke through! they were unstopab-
Hang on, more than one jailbreak?
Everyone calm down!
Who did this..? Who led them?
His name is...

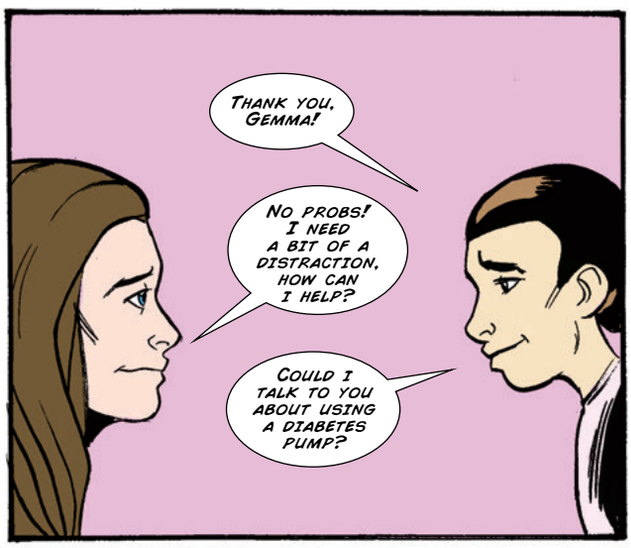

...keetz!

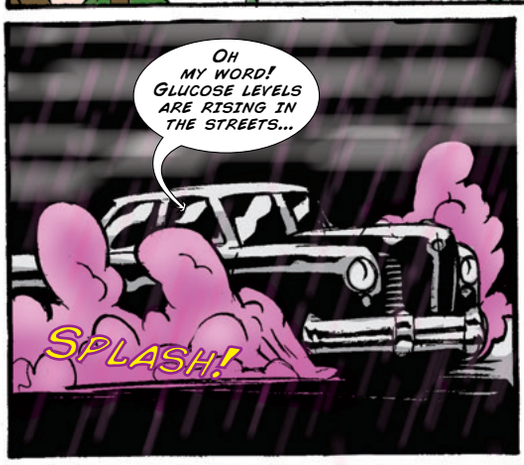

And where are they all headed now?
Only one place they could be...


Gary
Are we meeting up tomorrow then, Gary? :)
1:26
Oh I'm so sorry I completely forgot, I have to study tomorrow!
1:48

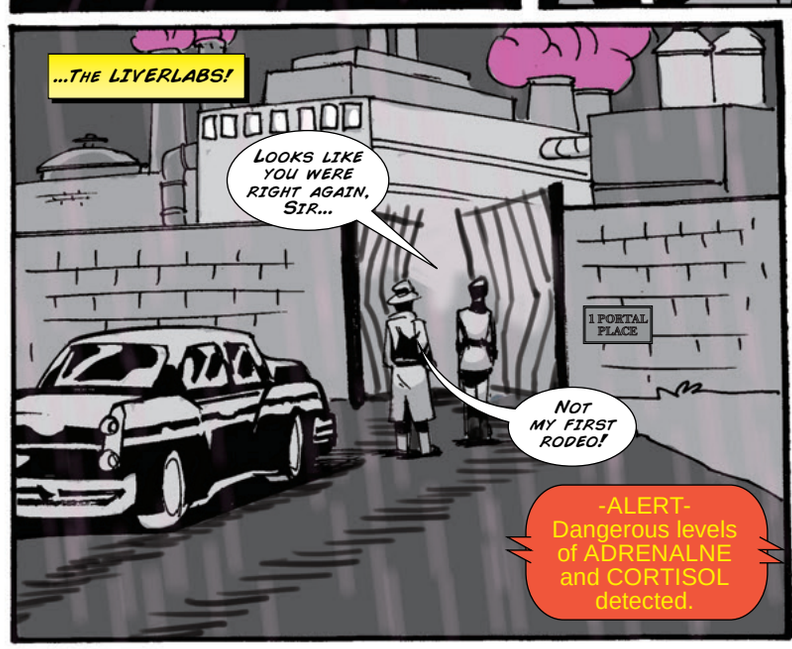

GEMMA, LITTLE MAYA AND HER GRANDMA POPPED IN TO ASK YOU A FEW QUESTIONS!
I KNOW YOU WERE FEELING A LITTLE OFF THIS MORIING BUT ARE YOU OKAY TO ANSWER THEM?

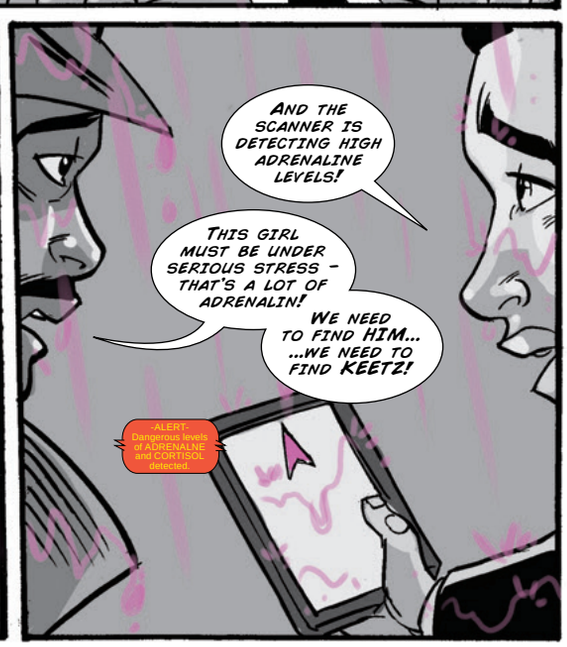

YEAH, I'M OKAY, JUST A LITTLE SORE STOMACH - I HAVEN'T EATEN YET!
YOU'RE STUDYING TOO HARD WITH ALL THOSE LATE NIGHTS, NOT EATING RIGHT AND TOO MUCH COFFEE - YOU'RE OVERDOING IT!
I'LL BE FINE, MUM! HAPPY TO ANSWER ANY QUESTIONS OF MAYA'S BEFORE I GET DINNER.

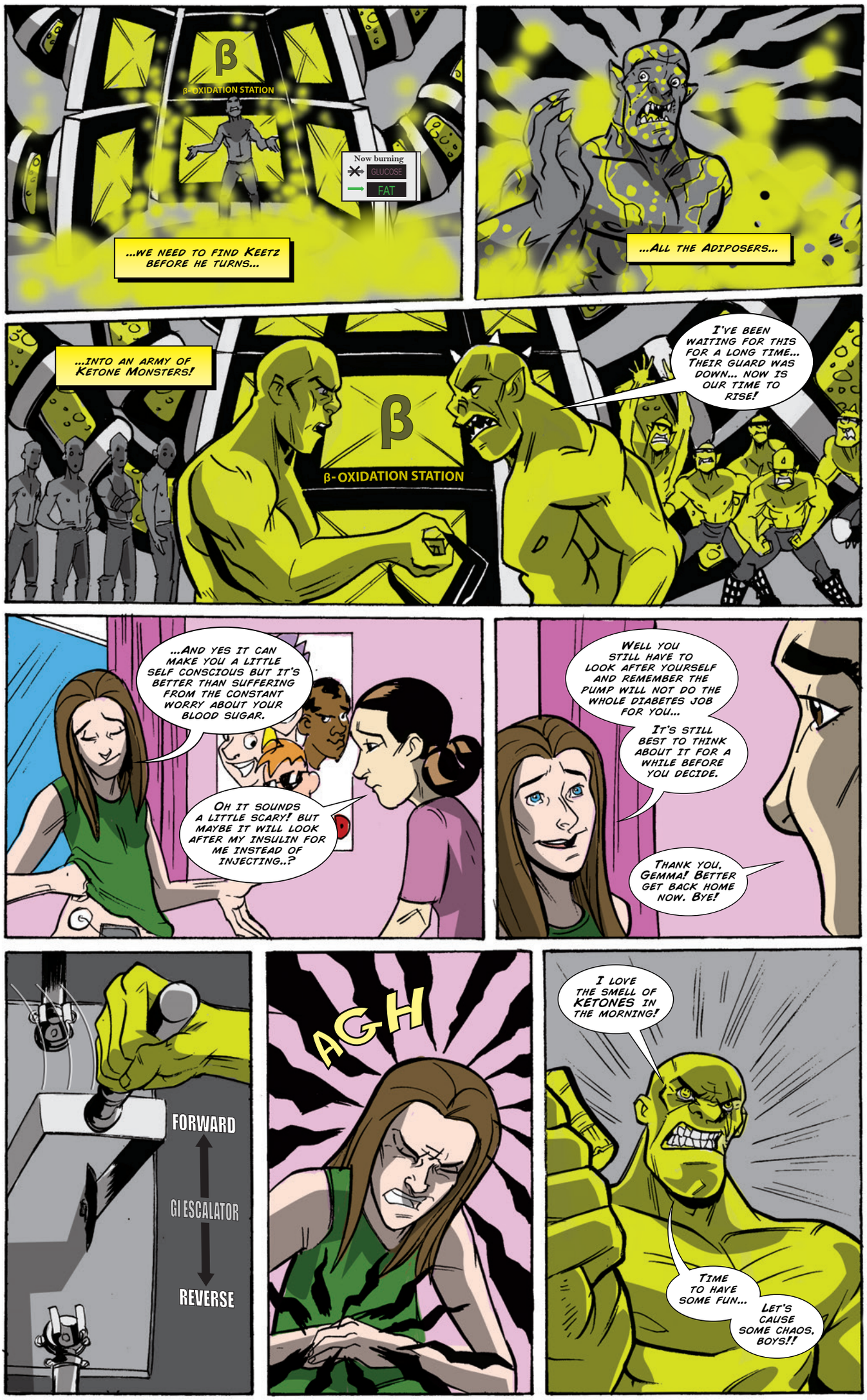

THANK YOU, GEMMA!
NO PROBS! I NEED A BIT OF A DISTRACTION, HOW CAN I HELP?
COULD I TALK TO YOU ABOUT USING A DIABETES PUMP?

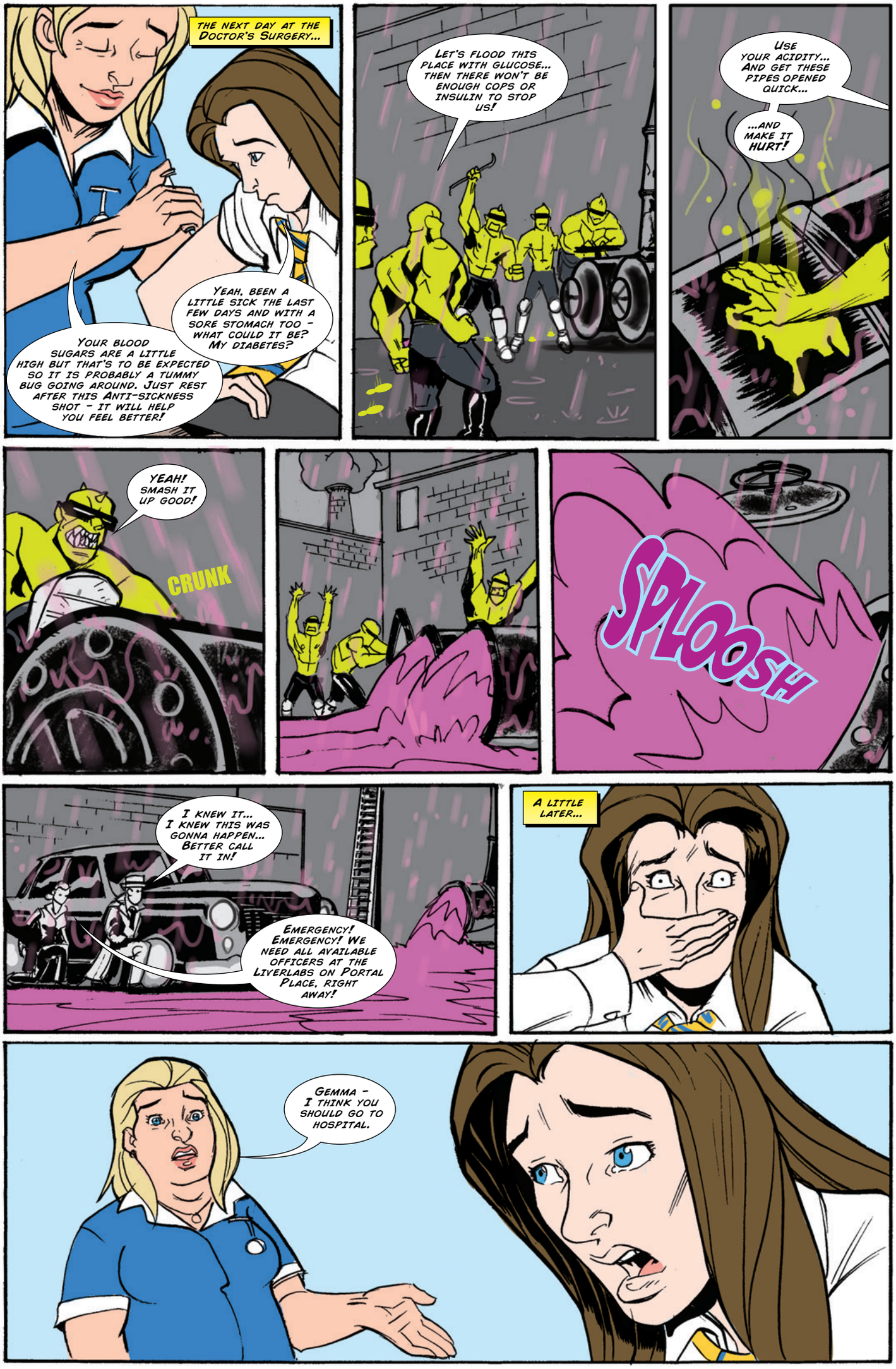

OH MY WORD! GLUCOSE LEVELS ARE RISING IN THE STREETS...
SPLASH!

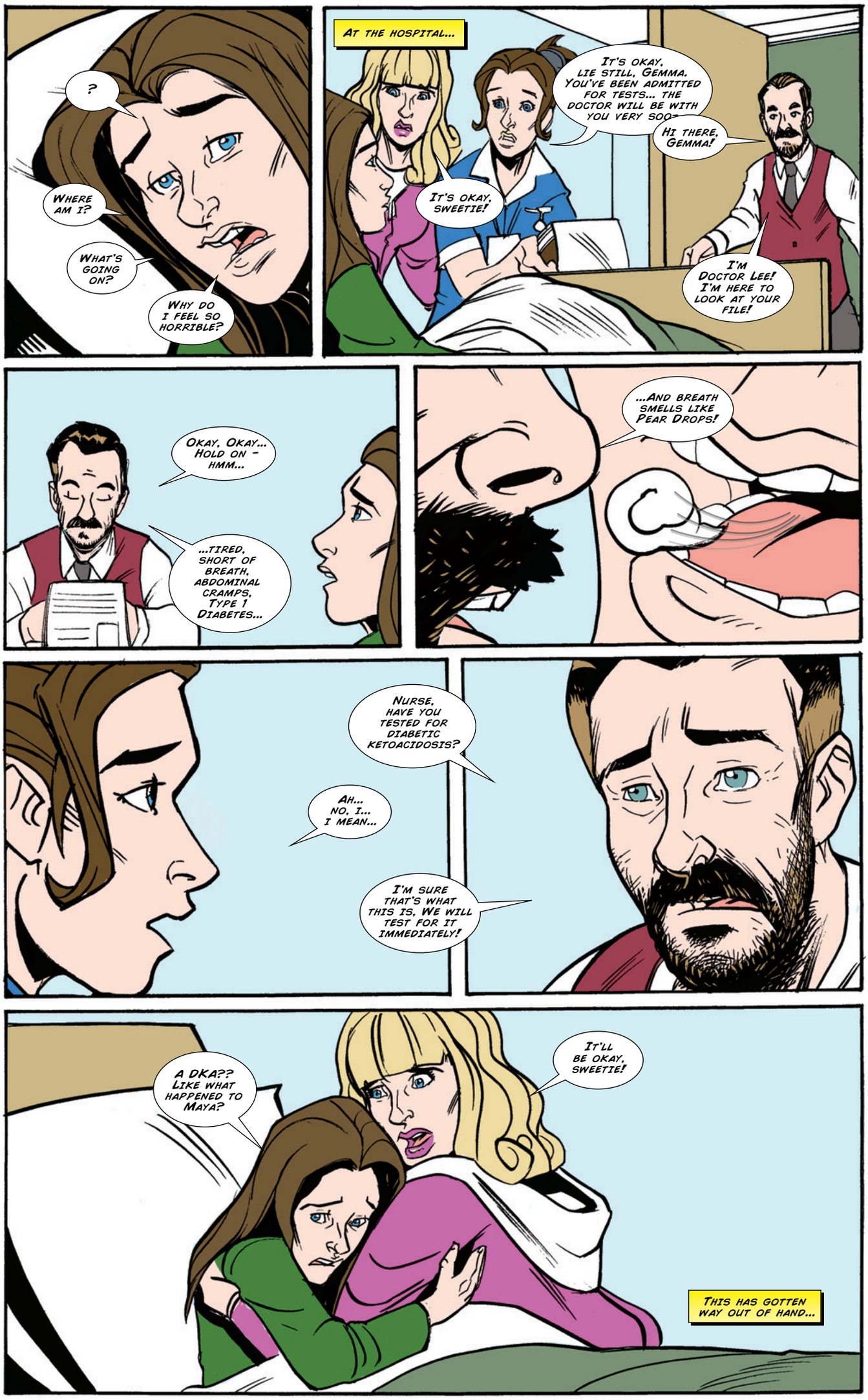

WHERE'S IT ALL COMING FROM?
SAME PLACE AS WHERE ALL THE COPS WENT... SAME PLACE ALL THE ADIPOSERS ARE HEADED...

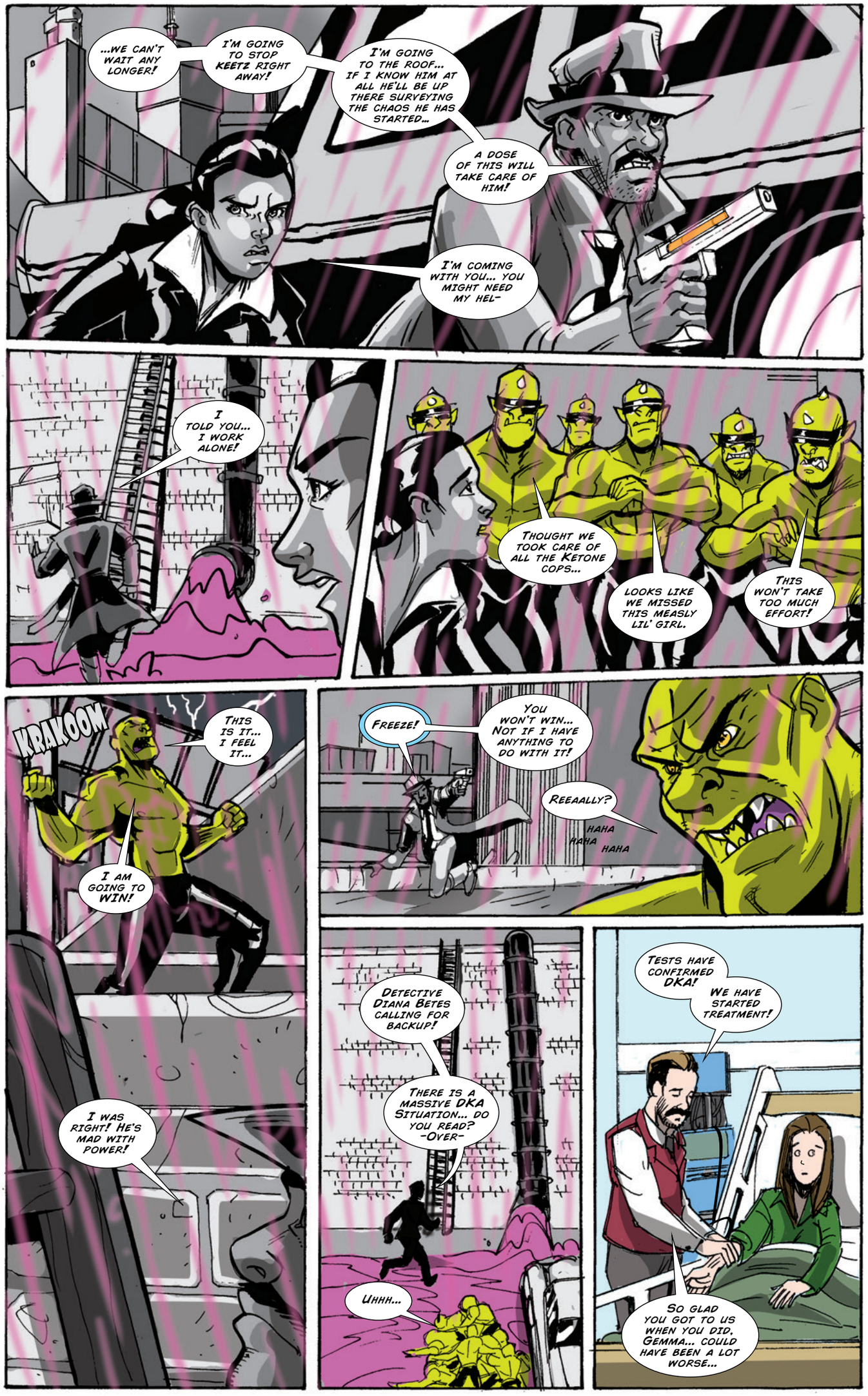

...THE LIVERLABS!
LOOKS LIKE YOU WERE RIGHT AGAIN, SIR...
1 PORTAL PLACE
NOT MY FIRST RODEO!
-ALERT- Dangerous levels of ADRENALNE and CORTISOL detected.

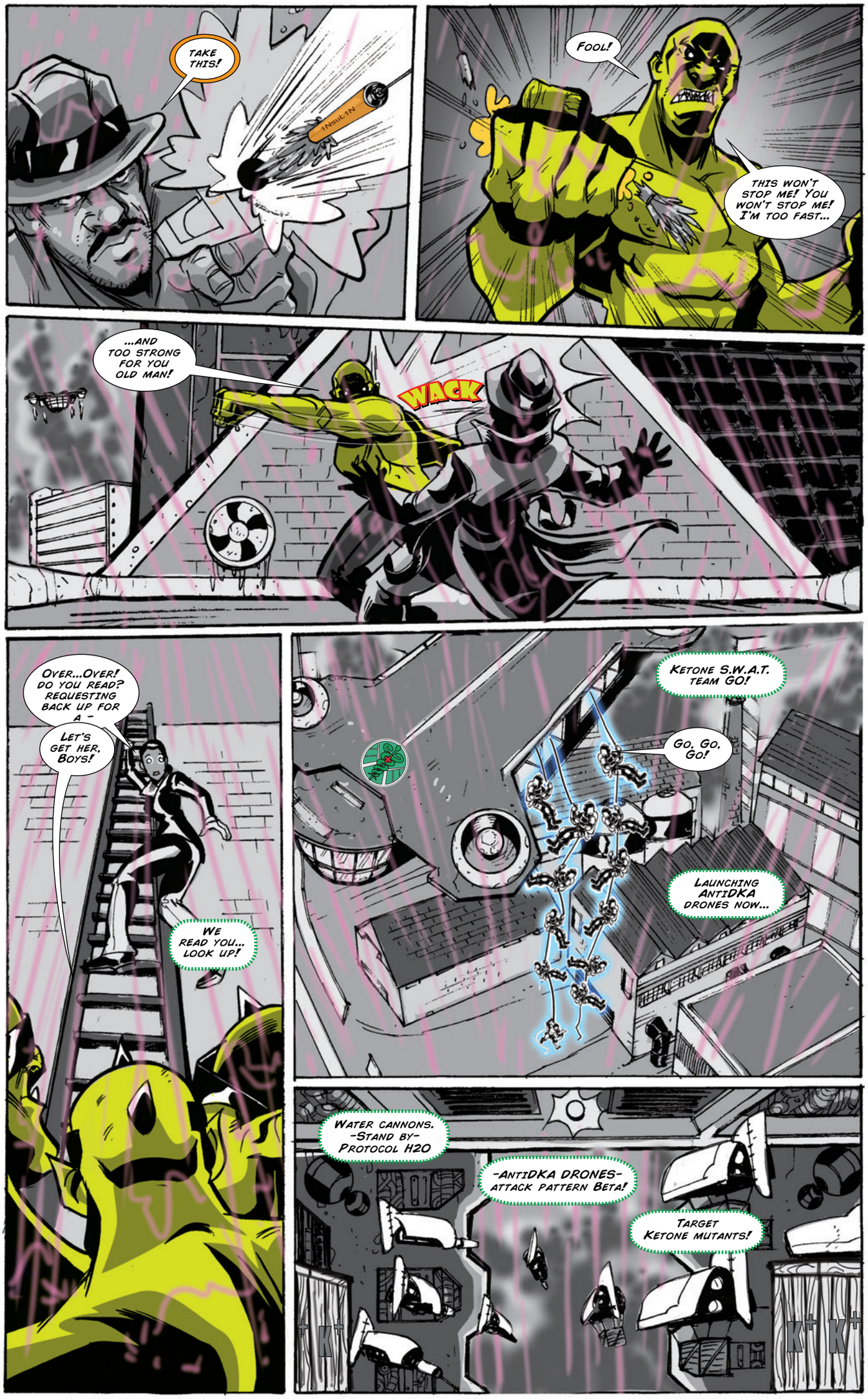

AND THE SCANNER IS DETECTING HIGH ADRENALINE LEVELS!
THIS GIRL MUST BE UNDER SERIOUS STRESS - THAT'S A LOT OF ADRENALIN!
WE NEED TO FIND HIM... ...WE NEED TO FIND KEETZ!
-ALERT- Dangerous levels of ADRENALNE and CORTISOL detected.

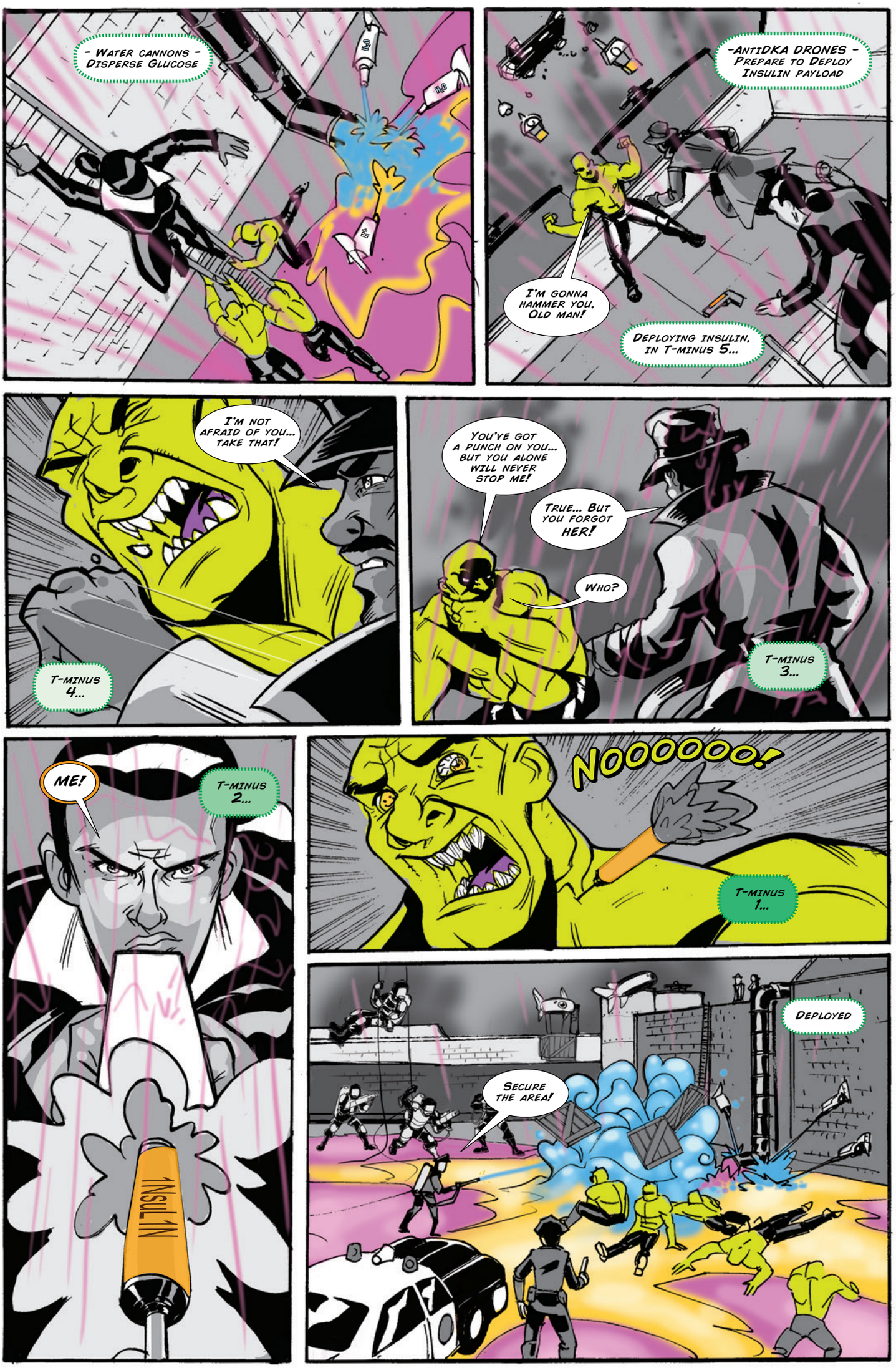

β
β-OXIDATION STATION
Now burning
GLUCOSE
FAT
...WE NEED TO FIND KEETZ BEFORE HE TURNS...
...ALL THE ADIPOSERS...
...INTO AN ARMY OF KETONE MONSTERS!
I'VE BEEN WAITING FOR THIS FOR A LONG TIME... THEIR GUARD WAS DOWN... NOW IS OUR TIME TO RISE!
...AND YES IT CAN MAKE YOU A LITTLE SELF CONSCIOUS BUT IT'S BETTER THAN SUFFERING FROM THE CONSTANT WORRY ABOUT YOUR BLOOD SUGAR.
OH IT SOUNDS A LITTLE SCARY! BUT MAYBE IT WILL LOOK AFTER MY INSULIN FOR ME INSTEAD OF INJECTING..?
WELL YOU STILL HAVE TO LOOK AFTER YOURSELF AND REMEMBER THE PUMP WILL NOT DO THE WHOLE DIABETES JOB FOR YOU...
IT'S STILL BEST TO THINK ABOUT IT FOR A WHILE BEFORE YOU DECIDE.
THANK YOU, GEMMA! BETTER GET BACK HOME NOW. BYE!
FORWARD
GI ESCALATOR
REVERSE
AGH
I LOVE THE SMELL OF KETONES IN THE MORNING!
TIME TO HAVE SOME FUN...
LET'S CAUSE SOME CHAOS, BOYS!!

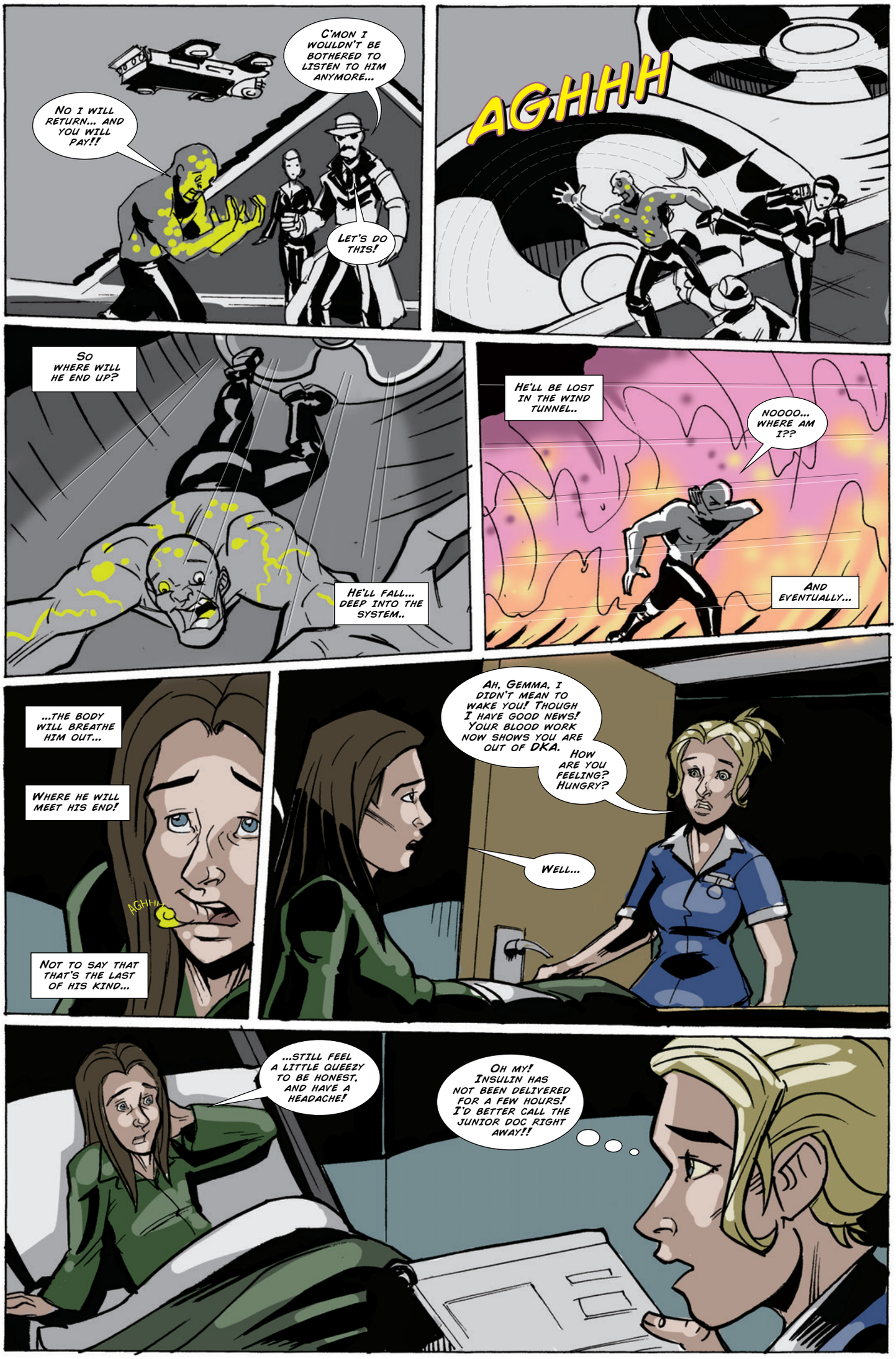

THE NEXT DAY AT THE DOCTOR'S SURGERY...
YEAH, BEEN A LITTLE SICK THE LAST FEW DAYS AND WITH A SORE STOMACH TOO - WHAT COULD IT BE? MY DIABETES?
YOUR BLOOD SUGARS ARE A LITTLE HIGH BUT THAT'S TO BE EXPECTED SO IT IS PROBABLY A TUMMY BUG GOING AROUND. JUST REST AFTER THIS ANTI-SICKNESS SHOT - IT WILL HELP YOU FEEL BETTER!
LET'S FLOOD THIS PLACE WITH GLUCOSE... THEN THERE WON'T BE ENOUGH COPS OR INSULIN TO STOP US!
USE YOUR ACIDITY... AND GET THESE PIPES OPENED QUICK...
...AND MAKE IT HURT!
YEAH! SMASH IT UP GOOD!
CRUNK
SPLOOSH
I KNEW IT... I KNEW THIS WAS GONNA HAPPEN... BETTER CALL IT IN!
EMERGENCY! EMERGENCY! WE NEED ALL AVAILABLE OFFICERS AT THE LIVERLABS ON PORTAL PLACE, RIGHT AWAY!
A LITTLE LATER...
GEMMA - I THINK YOU SHOULD GO TO HOSPITAL.

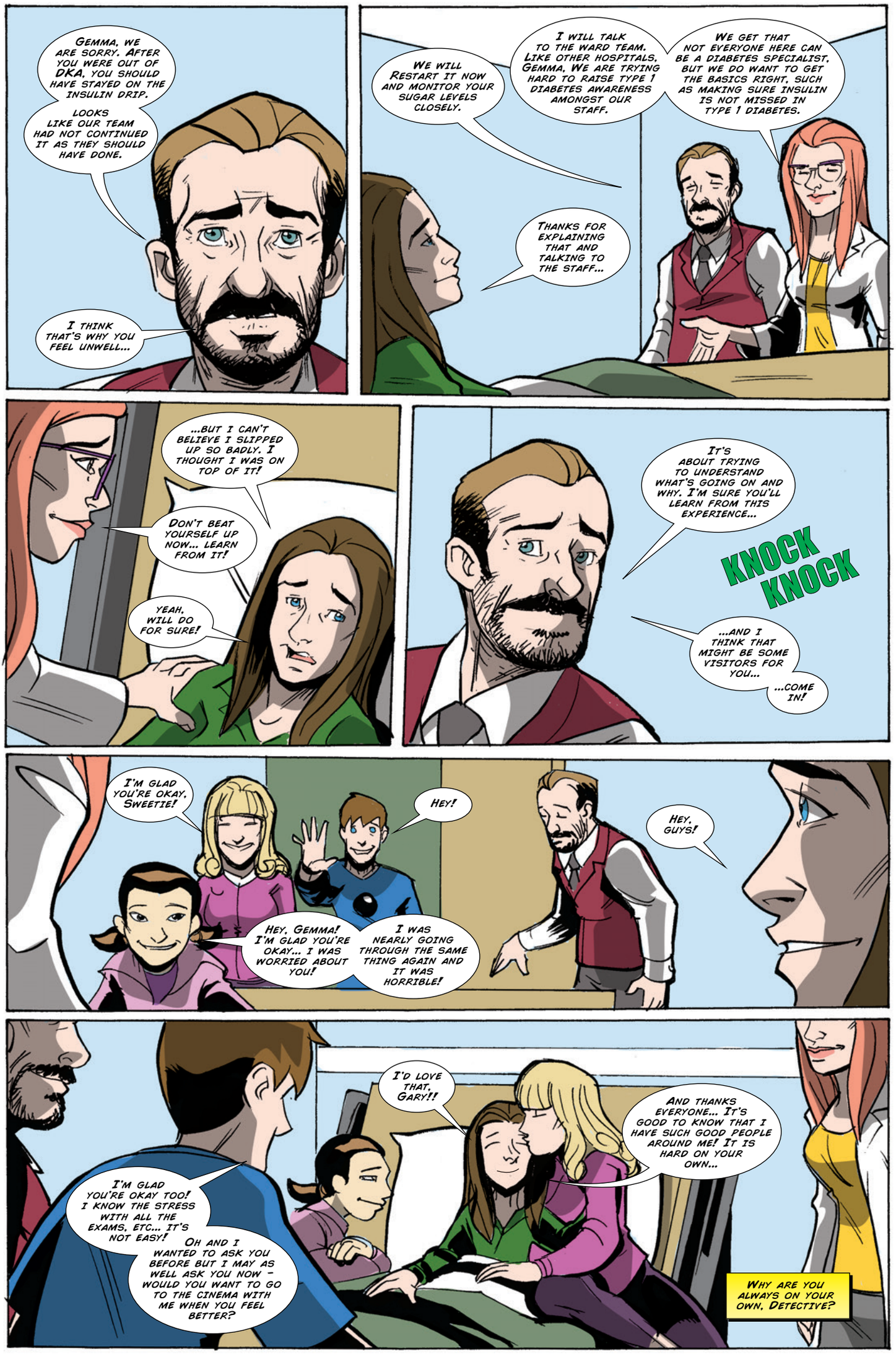

?
Where am I?
What's going on?
Why do I feel so horrible?
At the hospital...
It's okay, lie still, Gemma. You've been admitted for tests... the doctor will be with you very soo-
Hi there, Gemma!
It's okay, sweetie!
I'm Doctor Lee! I'm here to look at your file!
Okay, Okay... Hold on - hmm...
...tired, short of breath, abdominal cramps, Type 1 Diabetes...
...And breath smells like Pear Drops!
Nurse, have you tested for diabetic ketoacidosis?
Ah... no, I... I mean...
I'm sure that's what this is. We will test for it immediately!
A DKA?? Like what happened to Maya?
It'll be okay, sweetie!
This has gotten way out of hand...


...We can't wait any longer!
I'm going to stop KEETZ right away!
I'm going to the roof... If I know him at all he'll be up there surveying the chaos he has started...
A dose of this will take care of him!
I'm coming with you... you might need my hel-
I told you... I work alone!
Thought we took care of all the KETONE cops...
Looks like we missed this measly lil' girl.
This won't take too much effort!
KRAKOOM
This is it... I feel it...
I am going to WIN!
I was right! He's mad with power!
Freeze!
You won't win... Not if I have anything to do with it!
Reeaally?
haha haha haha
Detective Diana Betes calling for backup!
There is a massive DKA situation... do you read? -Over-
Uhhh...
Tests have confirmed DKA!
We have started treatment!
So glad you got to us when you did, Gemma... could have been a lot worse...


TAKE THIS!
INSULIN
FOOL!
THIS WON'T STOP ME! YOU WON'T STOP ME! I'M TOO FAST...
...AND TOO STRONG FOR YOU OLD MAN!
WACK
OVER...OVER! DO YOU READ? REQUESTING BACK UP FOR A -
LET'S GET HER, BOYS!
WE READ YOU... LOOK UP!
KETONE S.W.A.T. TEAM GO!
GO, GO, GO!
LAUNCHING ANTIDKA DRONES NOW...
WATER CANNONS. -STAND BY- PROTOCOL H2O
-ANTIDKA DRONES- ATTACK PATTERN BETA!
TARGET KETONE MUTANTS!
K+
K+
K+


- Water cannons - Disperse Glucose
H2O
-AntiDKA DRONES - Prepare to Deploy Insulin payload
I'm gonna hammer you, Old man!
Deploying insulin, in T-minus 5...
I'm not afraid of you... take that!
T-minus 4...
You've got a punch on you... but you alone will never stop me!
True... But you forgot HER!
Who?
T-minus 3...
ME!
T-minus 2...
1NSUL1N
NOOOOOO!
T-minus 1...
Secure the area!
Deployed


C'MON I WOULDN'T BE BOTHERED TO LISTEN TO HIM ANYMORE...
NO I WILL RETURN... AND YOU WILL PAY!!
LET'S DO THIS!
AGHHH
SO WHERE WILL HE END UP?
HE'LL FALL... DEEP INTO THE SYSTEM..
HE'LL BE LOST IN THE WIND TUNNEL..
NOOOO... WHERE AM I??
AND EVENTUALLY...
...THE BODY WILL BREATHE HIM OUT...
WHERE HE WILL MEET HIS END!
AGHHH
NOT TO SAY THAT THAT'S THE LAST OF HIS KIND...
AH, GEMMA, I DIDN'T MEAN TO WAKE YOU! THOUGH I HAVE GOOD NEWS! YOUR BLOOD WORK NOW SHOWS YOU ARE OUT OF DKA.
HOW ARE YOU FEELING? HUNGRY?
WELL...
...STILL FEEL A LITTLE QUEEZY TO BE HONEST, AND HAVE A HEADACHE!
OH MY! INSULIN HAS NOT BEEN DELIVERED FOR A FEW HOURS! I'D BETTER CALL THE JUNIOR DOC RIGHT AWAY!!


Gemma, we are sorry. After you were out of DKA, you should have stayed on the insulin drip.
looks like our team had not continued it as they should have done.
I think that's why you feel unwell...
We will Restart it now and monitor your sugar levels closely.
I will talk to the ward team. Like other hospitals, Gemma, We are trying hard to raise type 1 diabetes awareness amongst our staff.
We get that not everyone here can be a diabetes specialist, but we do want to get the basics right, such as making sure insulin is not missed in type 1 diabetes.
Thanks for explaining that and talking to the staff...
...but I can't believe I slipped up so badly. I thought I was on top of it!
Don't beat yourself up now... learn from it!
yeah, will do for sure!
It's about trying to understand what's going on and why. I'm sure you'll learn from this experience...
KNOCK KNOCK
...and I think that might be some visitors for you...
...come in!
I'm glad you're okay, Sweetie!
Hey!
Hey, guys!
Hey, Gemma! I'm glad you're okay... I was worried about you!
I was nearly going through the same thing again and it was horrible!
I'd love that, Gary!!
And thanks everyone... It's good to know that I have such good people around me! It is hard on your own...
I'm glad you're okay too! I know the stress with all the exams, etc... It's not easy!
Oh and I wanted to ask you before but I may as well ask you now - would you want to go to the cinema with me when you feel better?
Why are you always on your own, Detective?


Why are you always on your own, Detective?
Gives me time to think!
Detective?
Think about what?
Think about what big bad storm is brewing next...
Next? But we just defeated the Ketone Mutants!
You think they won't ever be back? they will be...
...they'll be back, and we must stay strong!
We're stronger together, though... we make a good team! if they come back, as partners, we can take them on!
We'll have each others back. together we'll can make sure we're one step ahead of whatever comes next... that's what'll make us strong!!
What do you say? Partners?
Okay, Partner! We'll be ready for them next time!!
We sure will!
...The End??

Action on High Glucose in Type 1 Diabetes

To paraphrase Liam Neeson from the movie 'Taken', living well with type 1 diabetes requires 'a very particular set of skills, skills that can take a long time to acquire'. With that said, we hope our story has highlighted the need to be aware of Diabetic KetoAcidosis (DKA) for people living with type 1 diabetes, as well as those close to them and all healthcare professionals. Here are some action points to learn and remember –

Symptoms suggestive of high glucose (hyperglycaemia)

Thirst, passing more water than usual, tiredness or nausea, blurred vision, headache

Causes of hyperglycaemia

- Reduced physical activity (prolonged bed rest, recovery from an operation)
- An acute situation: illness (e.g. gastroenteritis), evolving DKA, infection, other pancreatic problems, dehydration
- Insulin related: missed or delayed dose, incorrect dose, out of date or sun damaged insulin
- Insulin delivery related: damaged insulin pen, faulty insulin infusion pump, mixed insulin not agitated correctly, lumpy or fluid filled injection site used
- 'Tummy' related: overtreatment of hypoglycaemia, too many glucose containing snacks/treats, mismatch between glucose based food eaten and insulin dosing, vomiting
- Other: excess alcohol consumption (can increase dehydration and ketone production), substance abuse, use of steroids, pregnancy, periods

Anyone with type 1 diabetes is encouraged to have a plan provided for them by their local healthcare team for what to do if they feel unwell ('sick day rules'). It should give information on food choices and guidance on insulin dose adjustments, with relevant emergency contact details. The need to check ketones in type 1 diabetes at times of illness or stress does not go away with advancing age.

- DKA must ALWAYS be considered EARLY, at times of stress and illness.
- An appropriate level of insulin in the body is essential at all times to promote the uptake of glucose for its use as fuel.
- The stress of illness in particular is associated with promoting more glucose than usual to be released from the liver.
- This is even if less food than usual is eaten. People living with type 1 diabetes may not necessarily think about increasing their usual dose of administered insulin to control for this higher amount of glucose.

Everyone with type 1 diabetes, regardless of age, should have access to a means of checking their ketones promptly when unwell. If the 'at risk of DKA' threshold is exceeded, with high urine (more than '+2' on a dipstick) or blood ketone levels (above 1.5mmol/L) measured, then further medical assessment may be required. Vomiting in type 1 diabetes should ALWAYS prompt a ketone check, as this is a common and early indicator of DKA. Increased thirst, as well as nausea, tummy pain and rapid, deep breathing may also be experienced, along with increasing tiredness. It is also worth noting that ketone production can occur and be associated with these symptoms, even if the glucose level is only slightly raised. Ketones can sometimes cause a distinctive smell on the breath (very much like pear drop sweets).

Early action can prevent DKA from developing

- If blood glucose levels are higher than usual for at least 3 to 4 hours (above 14mmol/L or 250mg/dl) and associated with absent or only low levels of ketones, then other causes for this should be considered and addressed (some causes above)
- Keeping well hydrated with water or other sugar-free fluids can help dilute down high glucose levels and wash away ketones
- Additional insulin or adjustments to existing doses may also be needed to keep glucose levels down. This is even if less food than usual is being eaten. Sometimes, the amount of extra insulin needed in times of illness may seem very high and worrying, but is necessary.
- Do follow 'sick day rules' as advised.
- Blood glucose levels should be tested at least 4 times a day and overnight if unwell.
- It only takes a few hours of elevated glucose levels, with a relative shortage of insulin to switch on ketone production, which can result in DKA
- Insulin must NEVER be stopped in type 1 diabetes, particularly at times of illness.

Someone with type 1 diabetes may find themselves feeling too unwell to manage their diabetes. In this situation, if they or family members are concerned about impending DKA, then immediate consideration should be given to call an ambulance or to go to Accident and Emergency for an urgent medical assessment. If confirmed, DKA always requires hospital based care.

DKA: Now you **D**o **K**now **A**ll about it...please **D**o **K**eep **A**lert

thINkSULIN

Enough Insulin on board keeps the Ketones locked away, reducing the chance of DKA...

For further info

For further info on Type 1 diabetes- visit:
www.nhs.uk/conditions/type-1-diabetes/

And further information on DKA can be found at:
www.nhs.uk/conditions/diabetic-ketoacidosis/

And check out Vol. 1 where many other resources can be found too!

www.revolvecomics.com/read-diabetes-type-1-comics/

TYPE 1

Vol. 2

ATTACK OF THE KETONES

revolvecomics.com