MarkRoth\_2010 1 MarkRoth\_unk 0 12.64 <NA> <unk>
MarkRoth\_2010 1 MarkRoth\_2010 12.64 16.31 <NA> <unk> i 'm going to talk to you today about my work on suspended animation <unk>
MarkRoth\_2010 1 MarkRoth\_2010 16.3 29.76 <NA> now <unk> usually when i mention suspended animation <unk> people will flash me the vulcan sign and laugh <unk> but now i 'm not talking about gorking people out to fly to mars or even pandora
MarkRoth\_2010 1 MarkRoth\_2010 29.84 33.45 <NA> <unk> much fun as that may be i 'm talking about
MarkRoth\_2010 1 MarkRoth\_2010 33.08 36.93 <NA> the concept of using suspended animation
MarkRoth\_2010 1 MarkRoth\_2010 36.53 37.86 <NA> to
MarkRoth\_2010 1 MarkRoth\_2010 37.66 40.59 <NA> help people out in trauma
MarkRoth\_2010 1 MarkRoth\_2010 40.46 48.27 <NA> so what do i mean when i say suspended animation it is the process by which
MarkRoth\_2010 1 MarkRoth\_2010 47.99 49.77 <NA> animals
MarkRoth\_2010 1 MarkRoth\_2010 52.02 57.43 <NA> <unk> appear dead and then can wake up again without being harmed <unk> ok <unk> so
MarkRoth\_2010 1 MarkRoth\_2010 57.26 63.25 <NA> here is the sort of big idea if you look out at nature <unk>
MarkRoth\_2010 1 MarkRoth\_2010 63.42 72.13 <NA> you find that as you tend to see suspended animation <unk> you tend to see immortality <unk>
MarkRoth\_2010 1 MarkRoth\_2010 72.51 78.22 <NA> and so <unk> what i 'm going to tell you about is a way
MarkRoth\_2010 1 MarkRoth\_2010 78.09 79.94 <NA> to tell a person
MarkRoth\_2010 1 MarkRoth\_2010 79.9 81.62 <NA> <unk> who 's in trauma
MarkRoth\_2010 1 MarkRoth\_2010 81.28 85.75 <NA> find a way to de animate them a bit so they 're a little more immortal
MarkRoth\_2010 1 MarkRoth\_2010 85.75 93.5 <NA> when they have that heart attack an example of an organism or two that happens to be
MarkRoth\_2010 1 MarkRoth\_2010 93.37 99.96 <NA> quite immortal would be plant seeds or bacterial spores these creatures
MarkRoth\_2010 1 MarkRoth\_2010 100 103.99 <NA> <unk> are some of the most immortal life forms on our planet <unk> and
MarkRoth\_2010 1 MarkRoth\_2010 103.81 107.97 <NA> they tend to spend most of their time in suspended animation <unk>
MarkRoth\_2010 1 MarkRoth\_2010 108.44 121.2 <NA> bacterial spores are thought now by scientists to exist as individual cells that are alive but in suspended animation for as long as two hundred and fifty million years
MarkRoth\_2010 1 MarkRoth\_2010 120.98 125.08 <NA> to suggest that this all sort of about little tiny creatures
MarkRoth\_2010 1 MarkRoth\_2010 125 127.12 <NA> i want to bring it close to home
MarkRoth\_2010 1 MarkRoth\_2010 126.87 135.32 <NA> in the immortal germ line of human beings that is the eggs that sit in the ovaries
MarkRoth\_2010 1 MarkRoth\_2010 134.93 142.39 <NA> they actually sit there in a state of suspended animation for up to fifty years in the life of each woman
MarkRoth\_2010 1 MarkRoth\_2010 142.83 150.02 <NA> so then there 's also my favorite example of suspended animation <unk> this is
MarkRoth\_2010 1 MarkRoth\_2010 150.52 153.26 <NA> <unk> those of you with children you know about them
MarkRoth\_2010 1 MarkRoth\_2010 153.58 165.33 <NA> you go to the pet store or the toy store and you can buy these things you just open the bag and you just dump them into the plastic aquarium and in about a week or so you 'll have little shrimps swimming around <unk>
MarkRoth\_2010 1 MarkRoth\_2010 165.33 178.31 <NA> well i wasn 't so interested in the swimming i was interested in what was going on in the bag <unk> the bag on the toy store shelf where those shrimp sat in suspended animation indefinitely
MarkRoth\_2010 1 MarkRoth\_2010 178.03 179.19 <NA> so
MarkRoth\_2010 1 MarkRoth\_2010 180.56 191.19 <NA> <unk> these ideas of suspended animation are not just about cells and weird little organisms occasionally human beings are briefly de animated and the stories <unk>
MarkRoth\_2010 1 MarkRoth\_2010 191.14 197.43 <NA> of people who are briefly de animated that interest me the most are those having to do with the cold <unk>
MarkRoth\_2010 1 MarkRoth\_2010 203.04 212.71 <NA> <unk> and she was there for two hours before they extracted her she was extremely cold <unk> and she had no heartbeat for all intents and purposes she was dead frozen <unk>
MarkRoth\_2010 1 MarkRoth\_2010 212.25 214.6 <NA> seven hours later <unk>
MarkRoth\_2010 1 MarkRoth\_2010 215.01 222.01 <NA> still without a heartbeat they brought her back to life <unk> and she went on to be the head radiologist in the hospital that treated her
MarkRoth\_2010 1 MarkRoth\_2010 223.8 228.98 <NA> a couple of years later so i get really excited about these things about a couple of years later there was
MarkRoth\_2010 1 MarkRoth\_2010 231.21 237.23 <NA> she was from canada her father had gone out in the wintertime he was working night shift and she followed him outside in nothing but a diaper <unk>
MarkRoth\_2010 1 MarkRoth\_2010 236.89 242.42 <NA> and they found her hours later <unk> frozen lifeless <unk> and they brought her back to life
MarkRoth\_2010 1 MarkRoth\_2010 242.74 247.31 <NA> there was a 65 year old woman in duluth minnesota last year
MarkRoth\_2010 1 MarkRoth\_2010 246.94 254.97 <NA> that was found frozen and without a pulse in her front yard one morning in the winter <unk> and they brought her back to life the next day she was doing
MarkRoth\_2010 1 MarkRoth\_2010 254.93 258.36 <NA> <unk> so well they wanted to run tests on her she got cranky and just went home
MarkRoth\_2010 1 MarkRoth\_2010 259.58 266.86 <NA> so these are miracles right these are truly miraculous things that happen <unk> doctors have a saying
MarkRoth\_2010 1 MarkRoth\_2010 266.68 270.3 <NA> that in fact you 're not dead until you 're warm and dead
MarkRoth\_2010 1 MarkRoth\_2010 270.14 279.97 <NA> and it 's true <unk> it 's true in the new england journal of medicine there was a study published that showed that with appropriate rewarming people who had suffered
MarkRoth\_2010 1 MarkRoth\_2010 279.93 287.44 <NA> <unk> without a heartbeat heartbeat for three hours could be brought back to life without any neurologic problems that 's over fifty percent <unk>
MarkRoth\_2010 1 MarkRoth\_2010 287.13 290.39 <NA> so what i was trying to do is think of a way
MarkRoth\_2010 1 MarkRoth\_2010 290.16 299.98 <NA> that we could study suspended animation to think about a way to reproduce maybe what happened to the skier well
MarkRoth\_2010 1 MarkRoth\_2010 300 301.55 <NA> i have to tell you something very
MarkRoth\_2010 1 MarkRoth\_2010 301.38 307.43 <NA> odd and that is that being exposed to low oxygen does not always kill <unk>
MarkRoth\_2010 1 MarkRoth\_2010 307.72 313.97 <NA> so <unk> in this room there 's twenty percent oxygen or so and if we reduce the oxygen concentration
MarkRoth\_2010 1 MarkRoth\_2010 313.97 318.17 <NA> we will all be dead and in fact the animals we were working with in the lab
MarkRoth\_2010 1 MarkRoth\_2010 317.74 325.16 <NA> these little garden worms nematodes they were also dead when we exposed them to low oxygen and here 's the thing that should freak you out
MarkRoth\_2010 1 MarkRoth\_2010 325.15 329.91 <NA> and that is that when we lower the oxygen concentration further by one hundred
MarkRoth\_2010 1 MarkRoth\_2010 329.84 339.21 <NA> <unk> times to ten parts per million they were not dead <unk> they were in suspended animation <unk> and we could bring them back to life without any harm <unk>
MarkRoth\_2010 1 MarkRoth\_2010 339.92 347.67 <NA> and this precise oxygen concentration ten parts per million that caused suspended animation <unk> is conserved
MarkRoth\_2010 1 MarkRoth\_2010 347.75 349.78 <NA> we can see it in a variety of different
MarkRoth\_2010 1 MarkRoth\_2010 350.55 356.47 <NA> <unk> one of the creatures we see it in is a fish <unk> and we can turn its heartbeat on and off
MarkRoth\_2010 1 MarkRoth\_2010 356.16 361.96 <NA> by going in and out of suspended animation like you would a light switch <unk> so
MarkRoth\_2010 1 MarkRoth\_2010 361.65 364.57 <NA> this was pretty shocking to me
MarkRoth\_2010 1 MarkRoth\_2010 365.1 374.99 <NA> that we could do this <unk> and so i was wondering when we were trying to reproduce the work with the skier that we noticed that of course she had no
MarkRoth\_2010 1 MarkRoth\_2010 376.33 386.6 <NA> <unk> and so maybe she was in a similar state of suspended animation <unk> but of course she was also extremely cold so we wondered what would happen if we took our suspended animals and exposed them to the cold <unk> and so what we found <unk>
MarkRoth\_2010 1 MarkRoth\_2010 386.5 399.72 <NA> <unk> out was that if you take animals that are animated like you and i <unk> and you make them cold that is these were the garden worms now they 're dead <unk> but if you have them in suspended animation <unk> and move them into the cold <unk> they 're all
MarkRoth\_2010 1 MarkRoth\_2010 401.24 406.44 <NA> <unk> and there 's the very important thing there if you want to survive the cold you ought to be suspended <unk>
MarkRoth\_2010 1 MarkRoth\_2010 406.01 408.67 <NA> right <unk> it 's a really good thing <unk>
MarkRoth\_2010 1 MarkRoth\_2010 408.67 417.54 <NA> and so we were thinking about that about this relationship between these things and thinking about whether or not that 's what happened to the skier <unk>
MarkRoth\_2010 1 MarkRoth\_2010 417.2 425.32 <NA> and so we wondered might there be some agent that is in us something that we make ourselves that we might be able to regulate our own metabolic flexibility
MarkRoth\_2010 1 MarkRoth\_2010 425.43 430.75 <NA> <unk> in such a way as to be able to survive when we got extremely cold and might otherwise pass away i
MarkRoth\_2010 1 MarkRoth\_2010 431.19 437.35 <NA> thought it might be interesting to sort of hunt for such things <unk> you know <unk>
MarkRoth\_2010 1 MarkRoth\_2010 437.1 444.97 <NA> i should mention briefly here that physiology textbooks that you can read about will tell you that this is a kind of heretical thing to suggest
MarkRoth\_2010 1 MarkRoth\_2010 444.78 449.99 <NA> <unk> we have from the time we are slapped on the butt until we take our last dying
MarkRoth\_2010 1 MarkRoth\_2010 450.58 458.72 <NA> <unk> 're newborn to when we 're dead we we cannot reduce our metabolic rate below what 's called a standard or basal metabolic rate
MarkRoth\_2010 1 MarkRoth\_2010 459.16 470.36 <NA> but i knew that there were examples of creatures also mammals that do reduce their metabolic rate such as ground squirrels and bears <unk> they reduce their metabolic rate in the wintertime when they hibernate
MarkRoth\_2010 1 MarkRoth\_2010 470.77 479.88 <NA> so i wondered might we be able to find some agent or trigger that might induce such a state in us <unk> and so we went looking for such things
MarkRoth\_2010 1 MarkRoth\_2010 479.96 482.88 <NA> <unk> this was a period of time when we failed tremendously
MarkRoth\_2010 1 MarkRoth\_2010 482.45 494.5 <NA> <unk> ken robinson is here he talked about the glories of failure well we had a lot of them we tried many different chemicals and agents <unk> and we failed over and over again so one time i was at home
MarkRoth\_2010 1 MarkRoth\_2010 494.32 500.52 <NA> watching television on the couch while my wife was putting our child to bed and
MarkRoth\_2010 1 MarkRoth\_2010 500.06 504.97 <NA> i was watching a television show it was a television show it was a nova show
MarkRoth\_2010 1 MarkRoth\_2010 504.78 505.81 <NA> <unk> show
MarkRoth\_2010 1 MarkRoth\_2010 505.41 509.38 <NA> on pbs about caves in new mexico <unk>
MarkRoth\_2010 1 MarkRoth\_2010 508.89 519.73 <NA> and this particular cave was lechuguilla <unk> and this cave is incredibly toxic to humans the researchers had to suit up just to enter it it 's filled with this toxic gas hydrogen sulfide <unk>
MarkRoth\_2010 1 MarkRoth\_2010 519.84 528.29 <NA> now hydrogen sulfide is curiously present in us <unk> we make it ourselves <unk> the highest concentration is in our brains
MarkRoth\_2010 1 MarkRoth\_2010 530.08 535.16 <NA> <unk> yet it was used as a chemical warfare agent in world war i
MarkRoth\_2010 1 MarkRoth\_2010 535.39 541.61 <NA> it 's an extraordinarily toxic thing <unk> in fact in chemical accidents hydrogen sulfide
MarkRoth\_2010 1 MarkRoth\_2010 541.12 543.35 <NA> is known
MarkRoth\_2010 1 MarkRoth\_2010 542.89 549.96 <NA> to if you breathe too much of it you collapse to the ground you appear dead <unk> but if you were
MarkRoth\_2010 1 MarkRoth\_2010 568.55 578.49 <NA> <unk> you go into the research institute and you say hi <unk> i 'd like to buy some concentrated compressed gas cylinders of a lethal gas
MarkRoth\_2010 1 MarkRoth\_2010 578.3 579.85 <NA> because i have these ideas
MarkRoth\_2010 1 MarkRoth\_2010 579.78 588.73 <NA> <unk> see about wanting to suspend people <unk> it 's really going to be ok so that that 's kind of a tough day but i said there really is
MarkRoth\_2010 1 MarkRoth\_2010 588.84 595.12 <NA> some basis for thinking why you might want to do this as i said this agent is in us <unk>
MarkRoth\_2010 1 MarkRoth\_2010 595.12 604.97 <NA> and in fact here 's a curious thing it binds to the very place inside of your cells where oxygen binds and where you burn it and that you do this burning to live <unk> and so
MarkRoth\_2010 1 MarkRoth\_2010 604.96 609.68 <NA> <unk> we thought like in a game of musical chairs might we be able to
MarkRoth\_2010 1 MarkRoth\_2010 609.55 612.74 <NA> give a person
MarkRoth\_2010 1 MarkRoth\_2010 612.37 621.29 <NA> some hydrogen sulfide and might it be able to occupy that place like in a game of musical chairs where oxygen might bind and because you can 't bind the oxygen
MarkRoth\_2010 1 MarkRoth\_2010 621.1 629.07 <NA> maybe you wouldn 't consume it and then maybe it would reduce your demand for oxygen i mean who knows so
MarkRoth\_2010 1 MarkRoth\_2010 631.04 635.46 <NA> laughter so there 's the bit about the dopamine and being
MarkRoth\_2010 1 MarkRoth\_2010 635.46 644.55 <NA> a little bit what do you call it delusional <unk> and you might suggest that was it and so we wanted to find out might we be able to use
MarkRoth\_2010 1 MarkRoth\_2010 644.18 650.17 <NA> hydrogen sulfide in the presence of cold and we wanted to see whether we could reproduce this skier in
MarkRoth\_2010 1 MarkRoth\_2010 656.04 664.88 <NA> <unk> and when we get cold <unk> we shake and we shiver right <unk> we try to keep our core temperature at thirty seven degrees by actually burning more oxygen <unk>
MarkRoth\_2010 1 MarkRoth\_2010 664.88 666.4 <NA> so
MarkRoth\_2010 1 MarkRoth\_2010 667.5 674.26 <NA> it was interesting for us when we applied hydrogen sulfide to a mouse
MarkRoth\_2010 1 MarkRoth\_2010 675.31 682.31 <NA> <unk> when it was also cold because what happened is the core temperature of the mouse got cold <unk> it stopped moving
MarkRoth\_2010 1 MarkRoth\_2010 681.97 690.83 <NA> it appeared dead its oxygen consumption rate fell by tenfold and here 's the really important point <unk>
MarkRoth\_2010 1 MarkRoth\_2010 690.94 694.1 <NA> i told you hydrogen sulfide is in us it
MarkRoth\_2010 1 MarkRoth\_2010 693.82 704.13 <NA> 's rapidly metabolized <unk> and all you have to do after six hours of being in this state of de animation is simply put the thing out in room air and it warms up and it 's none the worse for wear
MarkRoth\_2010 1 MarkRoth\_2010 705.26 712.68 <NA> <unk> now <unk> this was cosmic really because we had found a way to <unk>
MarkRoth\_2010 1 MarkRoth\_2010 713.8 722.76 <NA> a mammal <unk> and it didn 't hurt it now we 'd found a way to reduce its oxygen consumption
MarkRoth\_2010 1 MarkRoth\_2010 722.76 725.05 <NA> to rock bottom levels and it was
MarkRoth\_2010 1 MarkRoth\_2010 727.02 731.8 <NA> <unk> in this state of de animation it could not go out dancing <unk> but
MarkRoth\_2010 1 MarkRoth\_2010 731.4 734.71 <NA> it was not dead and it was not harmed <unk>
MarkRoth\_2010 1 MarkRoth\_2010 734.48 736.42 <NA> so we started to think
MarkRoth\_2010 1 MarkRoth\_2010 736.22 746.77 <NA> is this the agent that might have been present in the skier <unk> and might have she had more of it than someone else <unk> and might that have been able to reduce <unk>
MarkRoth\_2010 1 MarkRoth\_2010 746.72 754.01 <NA> her demand for oxygen before she got so cold that she otherwise would have died as we found out with our worm experiments
MarkRoth\_2010 1 MarkRoth\_2010 755.74 762.47 <NA> <unk> so we wondered can we do anything useful with this
MarkRoth\_2010 1 MarkRoth\_2010 762.47 766.61 <NA> capacity to control metabolic flexibility and
MarkRoth\_2010 1 MarkRoth\_2010 766.72 774.81 <NA> one of the things we wondered i 'm sure some of you out there are economists and you know all about supply and demand and when supply is equal to demand
MarkRoth\_2010 1 MarkRoth\_2010 776.36 786.35 <NA> <unk> but when supply falls in this case of oxygen and demand stays high you 're dead <unk> so what i just told you is we can now reduce
MarkRoth\_2010 1 MarkRoth\_2010 786.19 792.6 <NA> demand <unk> we ought to be able to lower supply to unprecedented low levels without killing the animal
MarkRoth\_2010 1 MarkRoth\_2010 792.56 795.45 <NA> and with money we got from darpa
MarkRoth\_2010 1 MarkRoth\_2010 795.05 804.07 <NA> we could show just that if you give mice hydrogen sulfide you can lower their demand for oxygen <unk> and you can put them into oxygen
MarkRoth\_2010 1 MarkRoth\_2010 804.89 810.82 <NA> that are as low as five thousand feet above the top of mt everest <unk> and they can sit there for hours and there 's no problem <unk>
MarkRoth\_2010 1 MarkRoth\_2010 811.26 818.2 <NA> well this was really cool we also found out that we could subject animals to otherwise lethal blood loss and we could save them
MarkRoth\_2010 1 MarkRoth\_2010 817.86 824.96 <NA> if we gave them hydrogen sulfide <unk> so these proof of concept experiments led
MarkRoth\_2010 1 MarkRoth\_2010 826.48 834.6 <NA> <unk> i should found a company <unk> and we should take this out to a wider playing field i founded a company called ikaria
MarkRoth\_2010 1 MarkRoth\_2010 834.36 836.49 <NA> with others ' help <unk> and
MarkRoth\_2010 1 MarkRoth\_2010 836.28 841.32 <NA> this company the first thing it did was make a liquid formulation of hydrogen sulfide
MarkRoth\_2010 1 MarkRoth\_2010 841.14 849.98 <NA> an injectable form that we could put in and send it out to physician scientists all over the world who work on models of critical care medicine and the results are incredibly positive
MarkRoth\_2010 1 MarkRoth\_2010 849.82 854.52 <NA> in one model of heart attack animals given hydrogen sulfide
MarkRoth\_2010 1 MarkRoth\_2010 854.84 860.88 <NA> <unk> seventy percent reduction in heart damage compared to those who got the standard of care that you and i would receive if we were to have a heart attack here today
MarkRoth\_2010 1 MarkRoth\_2010 860.96 873.27 <NA> same is true for organ failure when you have loss of function owing to poor perfusion of kidney of liver <unk> acute respiratory distress syndrome and damage suffered in cardiac bypass surgery
MarkRoth\_2010 1 MarkRoth\_2010 875.58 881.14 <NA> <unk> these are the thought leaders in trauma medicine all over the world saying this is true so it seems
MarkRoth\_2010 1 MarkRoth\_2010 880.98 887.8 <NA> that exposure to hydrogen sulfide decreases damage that you receive from being exposed to otherwise lethal low oxygen
MarkRoth\_2010 1 MarkRoth\_2010 888.27 893.98 <NA> and i should say that the concentrations of hydrogen sulfide required to get this benefit
MarkRoth\_2010 1 MarkRoth\_2010 894.57 903.32 <NA> are low incredibly low in fact so low that physicians will not have to lower or dim the metabolism of people much at all to see the benefit i just mentioned
MarkRoth\_2010 1 MarkRoth\_2010 905.02 910.28 <NA> <unk> adopting this you don 't want to be gorking people out just to save them it 's really confusing so
MarkRoth\_2010 1 MarkRoth\_2010 912.22 918.8 <NA> i want to say that we 're in human trials <unk> now <unk> and so
MarkRoth\_2010 1 MarkRoth\_2010 923.56 929.97 <NA> thank you the phase one safety studies are over and we 're doing fine we 're now moved on we have to
MarkRoth\_2010 1 MarkRoth\_2010 929.93 934.71 <NA> <unk> get to phase two and phase three it 's going to take us a few years this has all moved very quickly <unk>
MarkRoth\_2010 1 MarkRoth\_2010 934.25 944.88 <NA> and the mouse experiments of hibernating mice happened in two thousand and five the first human studies were done in two thousand and eight <unk> and we should know in a couple of years whether it works or not <unk>
MarkRoth\_2010 1 MarkRoth\_2010 944.45 945.84 <NA> and
MarkRoth\_2010 1 MarkRoth\_2010 945.56 954.97 <NA> this all happened really quickly because of a lot of help from a lot of people i want to mention that first of all my wife without whom this talk and my work would not be possible so thank you very
MarkRoth\_2010 1 MarkRoth\_2010 954.93 956.23 <NA> <unk> much also
MarkRoth\_2010 1 MarkRoth\_2010 956.34 965.05 <NA> the brilliant scientists who work at my lab and also others on staff the fred hutchinson cancer research center in seattle washington wonderful place to work
MarkRoth\_2010 1 MarkRoth\_2010 965.34 975.11 <NA> and also the wonderful scientists and businesspeople at ikaria one thing those people did out there was take this technology of hydrogen sulfide which
MarkRoth\_2010 1 MarkRoth\_2010 975.55 984.18 <NA> <unk> company that 's burning venture capital very quickly <unk> and they fused it with another company that sells another toxic gas that 's more toxic than
MarkRoth\_2010 1 MarkRoth\_2010 984.18 989.58 <NA> hydrogen sulfide <unk> and they give it to newborn babies who would otherwise die
MarkRoth\_2010 1 MarkRoth\_2010 989.1 992.63 <NA> from a failure to be able to oxygenate their tissues properly <unk>
MarkRoth\_2010 1 MarkRoth\_2010 993.13 1003.25 <NA> and this gas that is delivered in over a thousand critical care hospitals worldwide <unk> now is approved on label and saves thousands of babies a year
MarkRoth\_2010 1 MarkRoth\_2010 1003.12 1004.52 <NA> from certain death
MarkRoth\_2010 1 MarkRoth\_2010 1005.41 1006.46 <NA> <unk> so
MarkRoth\_2010 1 MarkRoth\_2010 1006.01 1007.82 <NA> it 's really
MarkRoth\_2010 1 MarkRoth\_2010 1007.42 1016.86 <NA> incredible for me to be a part of this and i want to say that i think we 're on the path of understanding metabolic flexibility in a fundamental way <unk>
MarkRoth\_2010 1 MarkRoth\_2010 1016.86 1018.47 <NA> and that
MarkRoth\_2010 1 MarkRoth\_2010 1018.1 1025.17 <NA> in the not too distant future an emt might give an injection of hydrogen sulfide or some related compound
MarkRoth\_2010 1 MarkRoth\_2010 1026.36 1033.9 <NA> <unk> to a person suffering severe injuries <unk> and that person might de animate a bit they might become a little more immortal
MarkRoth\_2010 1 MarkRoth\_2010 1034.43 1036.76 <NA> their metabolism will fall
MarkRoth\_2010 1 MarkRoth\_2010 1039.29 1044.25 <NA> <unk> as though you were dimming a switch on a lamp at home <unk> and then
MarkRoth\_2010 1 MarkRoth\_2010 1044.21 1049.17 <NA> they will have the time that will buy them the time to be transported to the hospital
MarkRoth\_2010 1 MarkRoth\_2010 1051.14 1053.05 <NA> to get the care they need
MarkRoth\_2010 1 MarkRoth\_2010 1055.56 1064.54 <NA> <unk> and then after they get that care like the mouse like the skier <unk> like the 65 year old woman
MarkRoth\_2010 1 MarkRoth\_2010 1064.26 1071.6 <NA> they 'll wake up a miracle <unk> we hope not or maybe we just hope to make miracles a little more common