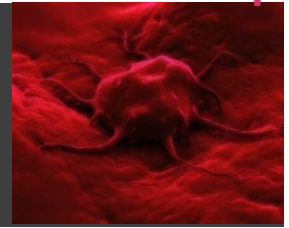




# Neuroblastoma & Stem Cells

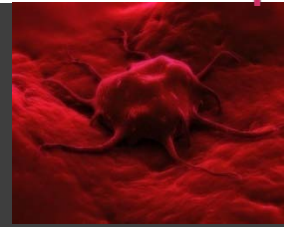
One out of ten childhood cancers

# What is Neuroblastoma?



- ❑ **Form of childhood cancer**
  - Rarely found in children older than ten years old
  - Most commonly occur before a child is two years old
- ❑ **These are cancerous cells formed in nerve tissue of the adrenal gland, neck, chest or spinal cord.**
- ❑ **Attacks the sympathetic nervous system, consisting of the brain, spinal cord and nerves that reach out to the rest of body.**
- ❑ **By the time a child is diagnosed , it is spread most often to the**
  - Lymph Nodes
  - Bones
  - Bone marrow
  - Liver
  - Skin





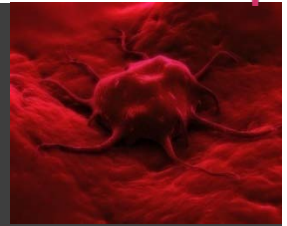
# Causes of Neuroblastoma

The factors that can raise the risk of neuroblastoma are not well understood but some of the factors that influence risk include:

- This type of cancer is usually **seen in infants and young babies** and is rare in those over 10 years of age.
- Around 1% to 2% of all neuroblastomas actually arise from **inherited genetic abnormalities**.
- **A family history** is a risk factor for the condition.
- The presence of a **genetic abnormality** usually means the child has a DNA alteration that causes oncogenes (tumour causing genes) to be switched on or tumor suppressing genes to be switched off.

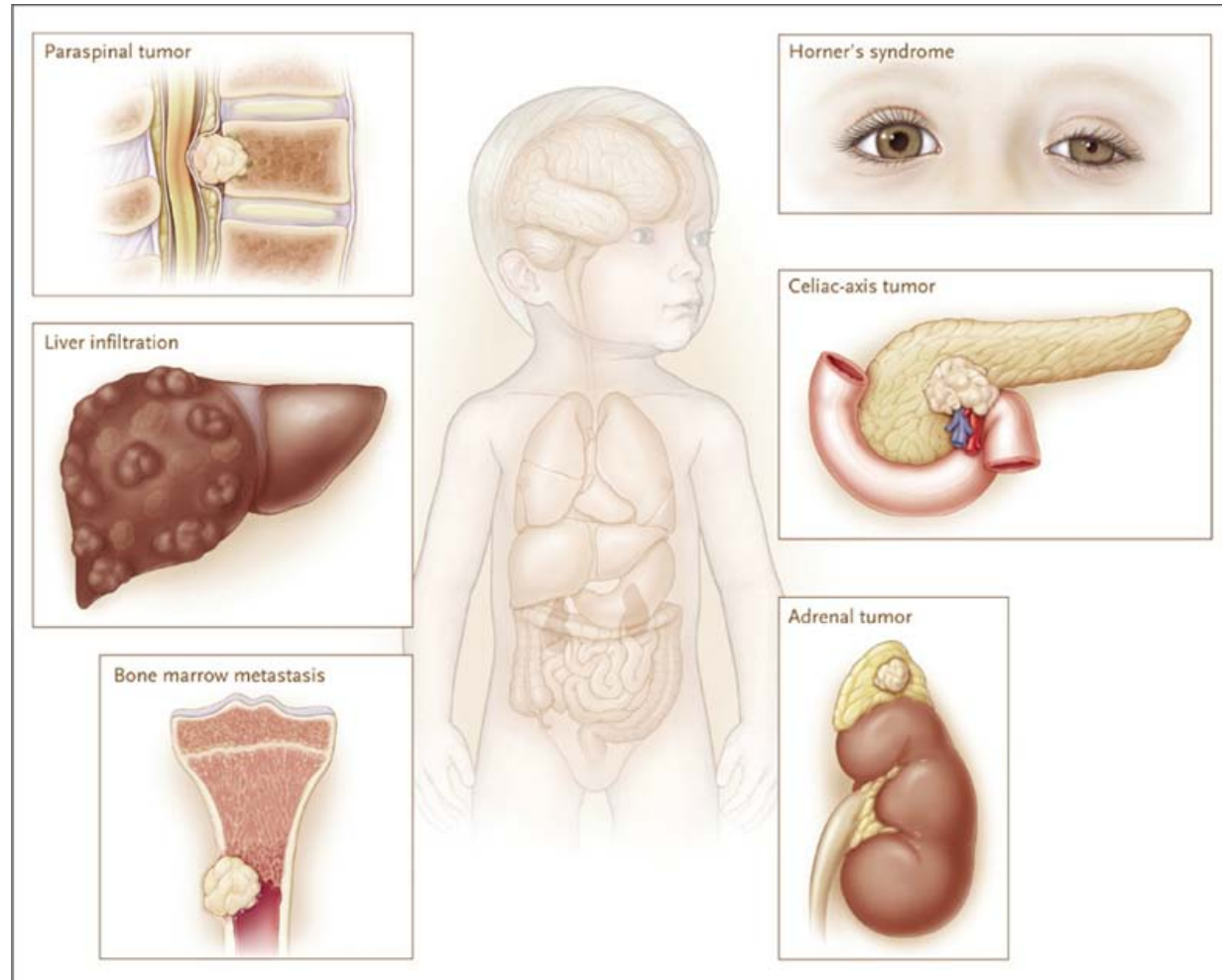


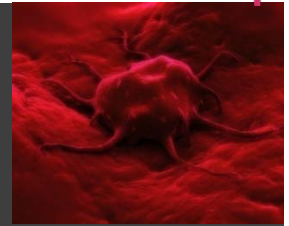
## causes



# Possible Sites of Neuroblastoma

- ❑ Neuroblastoma tumors begin in the adrenal gland
- ❑ They may metastasize through the body to the liver, spine, thorax, neck, pelvis, orbits, intestine, bone, skin, etc.

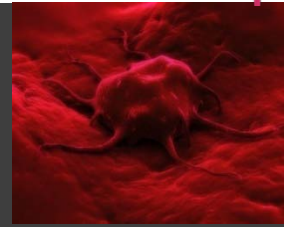




# Signs & Symptoms

- ❑ **Most Common Signs**
  - Bone or Joint Pain
  - Abdominal Pain
  - A lump in the abdomen, neck or chest
  
- ❑ **Other Common Signs**
  - Dark circles around eyes
  - Trouble breathing
  - Swollen stomach
  - Bulging eyes
  - Urinary retention
  - Constipation
  - Cough
  - Dyspnea

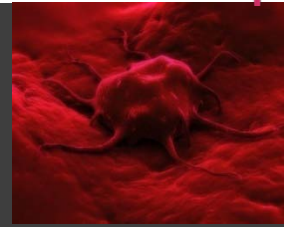




# Incidence

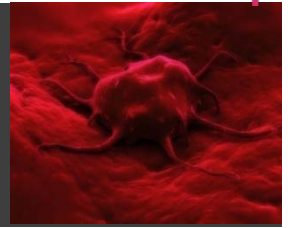
- ❑ 8% to 10% of all childhood cancers
- ❑ Most common malignant tumor of infancy
- ❑ Median age at diagnosis of 19 months [ Brodeus and Maris, 2006]
- ❑ There are no geographic or racial variations

# Stages of Neuroblastoma



- ❑ Stage 1:
  - Can be completely removed from surgery
  - Highest Success Rate
  
- ❑ Stage 2
  - The tumor is in only one area and all of the tumor that can be seen cannot be completely removed during surgery.
  
- ❑ Stage 3
  - The tumor is in only one area, on one side of the body, but has spread to lymph nodes on the other side of the body
  
- ❑ Stage 4
  - Cancer has spread throughout the body
  - Very difficult to fully kill off
  - Worst stage to be categorized in

# Test to figure out disease

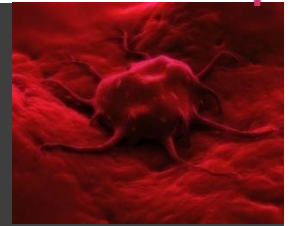


- Physical exam and history
- 24 Hour urine test
- Blood cultures & Blood chemistry studies
- Cytogenetic analysis
- Bone marrow aspiration and biopsy
- X- Ray
- CT Scan
- Ultra sound
- Neurological exam
- Immunohistochemistry study





# Treatments

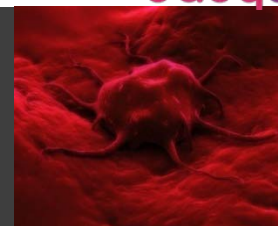


## Standard treatments used:

- ❑ Surgery [ Low Risk: Stage 1 ]
- ❑ Radiation & Chemotherapy [ Intermediate Risk: Stage 2 & 3 ]
- ❑ Stem Cell Transplant [ High Risk: Stage 3/4 ]



# Overview of Treatments [ Stem Cell Transplant ]



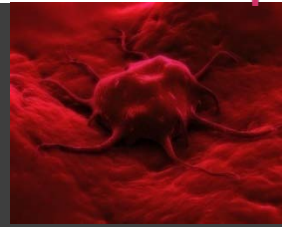
# Hope on the Horizon

for Young  
Neuroblastoma Patients

Through Stem  
Cell Transplant

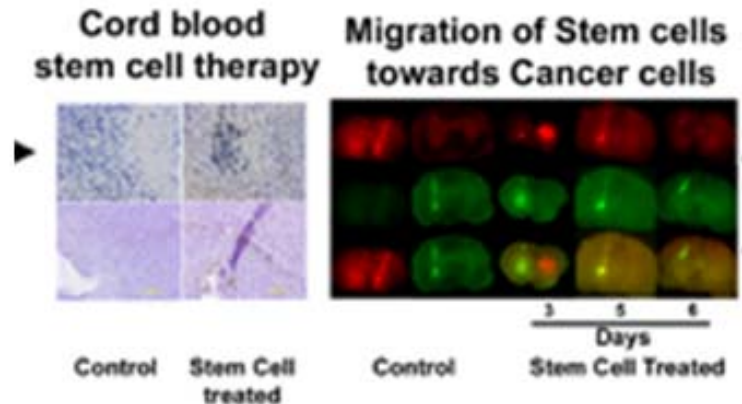
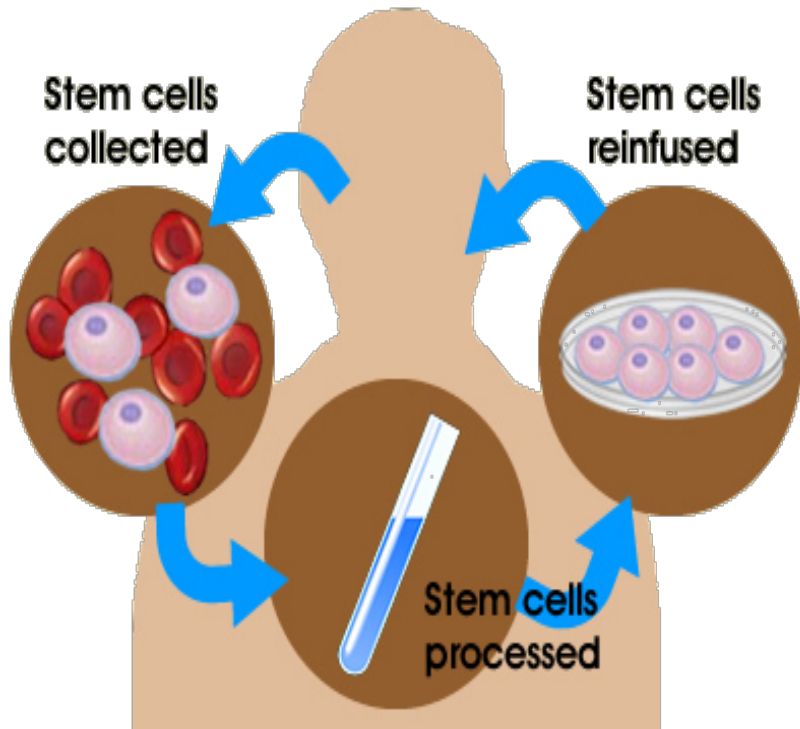


GIVING NEW HOPE

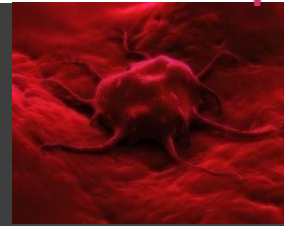


# Cord Blood Stem Cell Transplant

A cord blood transplant can serve two functions. It can treat genetic diseases by using donor cells to replace a patient's own cells with a missing factor. A cord blood transplant is also used to rescue a patient's bone marrow (the blood factory) when it has been destroyed by cancer therapy.



# Publications

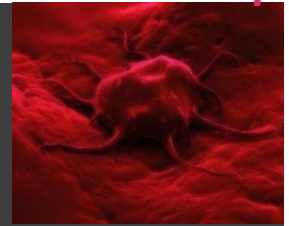


## Successful tandem (autologous-cord blood) SCT in advanced neuroblastomas with highly amplified MYCN

*K Goi et al: Bone Marrow Transplantation (2011) 46, 835–839; doi:10.1038/bmt.2010.191; published online 9 August 2010*

We performed a tandem transplantation consisting of **autologous PBSCT** (auto-PBSCT) followed by allogeneic **cord blood transplantation** (CBT) in **three consecutive pediatric patients with stage 4 neuroblastoma** exhibiting high MYCN amplification. They are alive without disease recurrence for 37–60 months after CBT. Severe acute complications did not occur in any patient and they have maintained disease-free survival for 37–60 months. **This strategy appears to be feasible and effective for the treatment of extremely high-risk neuroblastoma cases.**

# Publications



## Engraftment of unrelated cord blood after reduced-intensity conditioning regimen in children with refractory neuroblastoma: a feasibility trial

C Jubert et al, *Bone Marrow Transplantation* (2011) **46**, 232–237; doi:10.1038/bmt.2010.107; published online 3 May 2010

We therefore undertook a pilot trial of unrelated **cord blood transplantation** after reduced intensity conditioning regimen (RIC) **in children with relapsed neuroblastoma** to assess engraftment and tolerability in this heavily pretreated population. Six patients were enrolled: four were in partial responsive relapse, one with a mixed response and one in refractory relapse. All patients tolerated the regimen well and had donor engraftment with full neutrophil and plt recovery. In conclusion, unrelated **cord blood engrafts after RIC in children with refractory neuroblastoma**. Future research should be aimed at transplanting patients with minimal residual disease, using less intensive immunosuppression and adding NK-cell based post transplant immunotherapy.

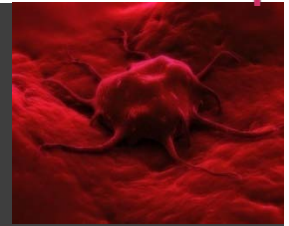


# Clinical Trial

## Descriptive Information

Brief Title	Chemotherapy, Radiation Therapy, and Umbilical Cord Blood Transplantation in Treating Patients With Hematologic Cancer (Leukemia, <b>Neuroblastoma</b> , Lymphoma, Myelodysplastic Syndromes)
Intervention	Procedure: <b>umbilical cord blood transplantation</b> Drug: busulfan Radiation: radiation therapy
Enrollment	3 patients
Completion Date	March 2006
Investigators	Barbara Jean Bambach, MD, Roswell Park Cancer Institute
NCT Number	NCT00003661

# Cord Blood Stem Cell Transplant

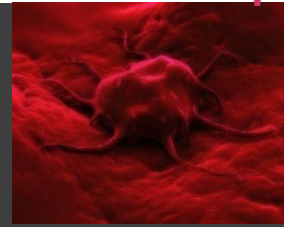


## Saving Frances

Umbilical Cord Blood Transplant saves her life  
from Neuroblastoma

[http://www.youtube.com/watch?v=aX0W\\_I876IU](http://www.youtube.com/watch?v=aX0W_I876IU)





# Further Information

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